

NETWORK WORLD

The Newsweekly of User Networking Strategies

Volume 7, Number 2

An IDG Communications Publication

January 8, 1990

Court weighs legal issues of caller ID

By Anita Taff
Washington Bureau Chief

HARRISBURG, Pa. — The battle over caller identification services has landed in court for the first time, raising the possibility that the issue could eventually end up in the U.S. Supreme Court or become the focus of congressional legislation.

On Dec. 29, a state appeals court judge barred Bell of Pennsylvania from offering caller ID services, which were scheduled to take effect this week, until a number of legal issues concerning the services could be resolved.

Opponents of caller ID claim this could be a test case in a battle between privacy advocates and providers of new network technologies that is likely to spread nationwide.

The ruling in Pennsylvania was the result of a suit filed against the Pennsylvania Public Utility Commission (PUC) by the Pennsylvania Consumer Advocate, the Pennsylvania Coalition Against Domestic Violence and the American Civil Liberties Union.

The groups are asking that users, on a free-of-charge and call-by-call basis, be allowed to prevent their phone numbers from appearing on a display device on the recipient's telephone.

(continued on page 47)

Pan Am net tracks passengers, baggage

1. Ticket agents use IBM Token-Ring Network-attached microcomputers to check in passengers and retrieve baggage numbers from remote hosts via an X.25 backbone.

2. Baggage scanners read tags and update passenger files showing where bags are stored.

3. Passengers insert encoded boarding pass into Token-Ring-attached card reader, showing they have boarded the aircraft.

Pan Am hopes to better track passengers and baggage by installing Token-Ring Networks in airports around the world and linking them to mainframes in Rockleigh, N.J., via an X.25 backbone.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: PAN AMERICAN WORLD AIRWAYS, INC., MIAMI

Pan Am steers new course with distributed network

Airline to replace dumb terminal net with token rings.

By Jim Brown
Senior Editor

MIAMI — Pan American World Airways, Inc. is migrating its global data network to a distributed architecture in which the company's mainframes will be linked via an X.25 backbone to IBM Token-Ring Networks in airports around the world.

The network upgrade, which is a key part of Pan Am's "Airport of the Future" strategy, is intended

to provide better security by streamlining baggage tracking and to increase business by improving customer service. The project is expected to take 18 months to complete.

The packet backbone will be more efficient and less expensive than the point-to-point network it will replace, and it will support communications between IBM mainframes in Pan Am's Rock-

(continued on page 6)

Novell to redress 16M token net problems

New software drivers will enable NetWare users to tap full capabilities of IBM's 16M bit/sec LAN.

By Laura DiDio
Senior Editor

PROVO, Utah — Novell, Inc. will introduce enhanced software drivers next quarter that will enable NetWare users to realize the full speed and functionality of IBM's 16M bit/sec Token-Ring Network, *Network World* discovered last week.

Although the 16M bit/sec Token-Ring has been available for more than a year, Novell users — the single largest group of local-area network users — have been frustrated in their attempts to exploit the high-speed LAN because of the inadequacy of Novell's drivers for the product.

Novell's existing Advanced 16/4 Token-Ring Driver is not sophisticated enough for IBM's 16M bit/sec network, the company admits. That driver is bundled into NetWare 2.1X and NetWare 386, and it is intended to be used with both 4M and 16M bit/sec Token-Ring LANs.

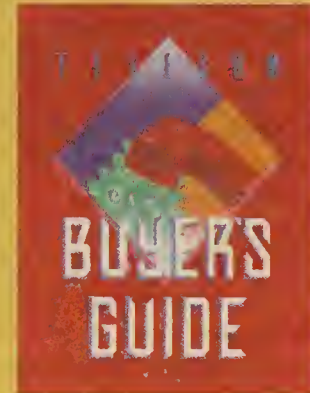
"I feel like I'm trying to assemble a puzzle and some of the key pieces are missing," said Lorie Mouklaf, a senior systems analyst at Hoechst Celanese Corp.'s Engineering Plastics Division in Chatham, N.J.

"The Novell Advanced 16/4 Token-Ring Driver never allowed

us to run our 16M bit/sec IBM Token-Ring at full speed. In fact, we couldn't get [the net] much above 4M bit/sec speeds," he said.

The problem stems from the fact that IBM did not reveal the specifications for its 16M bit/sec Token-Ring Adapter to Novell and the other major LAN vendors (continued on page 47)

INSIDE



Private-line options examined, page 29.

CSX unfolds unique plan for net move

By Paul Desmond
Senior Writer

JACKSONVILLE, Fla. — CSX Technology Corp. is installing a new breed of IBM front-end processors and an IBM Token-Ring Network to link 80 cluster controllers to a new remote data center, a configuration designed to maintain fast terminal response times.

In July, CSX will move its data center from its office building here to a suburb about eight miles away, leaving behind 2,100 users who are accustomed to the fast response times of channel-attached cluster controllers.

Faced with the challenge of maintaining that response time, CSX originally planned to link the 80 controllers to its mainframes by spending \$625,000 on five pairs of channel extenders and installing five T-1 lines to support them.

(continued on page 6)

NETLINE

INTEGRATING EDI with business applications yields bigger user benefits. Page 2.

RAILROAD USES ANI to gain a strategic business edge. Page 2.

NEW NYNEX SERVICE offers users switched links at T-1 and T-3 speeds. Page 2.

EARLY USERS LAUD new imaging services, saying they

streamline operations. Page 4.

AETNA TAPS DEC for net of MicroVAX 3400s to link Apple Macs, IBM hosts. Page 4.

SOUTH KOREA PLANS to build a nationwide X.25 net. Page 6.

NORTHERN TEL PREPS to sell its Mid-Atlantic customer base to Bell Atlantic. Page 47.

FEATURE

Third parties, EDI shape enterprise internetworks

By Salvatore Salamone
Features Writer

Companies are gaining competitive advantages by extending their corporate networks to trading partners and suppliers. Such companies find they must exchange information and ideas quickly with outsiders; simply making data available to one's own people is no longer good enough. This leads companies to reach out and interconnect their enterprise-wide networks.

Today, there are two major trends shaping enterprise internetworks: the use of electronic data interchange and the growing popularity of third-party network management services.

Third-party services often come into play when a company is establishing enterprise internetworks, according to Lee Foote, manager of

(continued on page 27)



Leading-edge users merge EDI, existing applications

Practice of integrating technology into business pays off with cost savings, increased functions.

By Wayne Eckerson
Senior Writer

Although many companies are struggling to reap tangible cost savings from their EDI programs, some leading users are realizing substantial benefits by integrating EDI into their existing business applications.

Pioneering companies are tying electronic data interchange systems directly to internal data bases and departmental applications, enabling companies to drastically reduce clerical costs and facilitate such cost-saving

processes as just-in-time manufacturing and Quick Response deliveries.

Integrate or lose

"If companies don't integrate EDI into their internal applications, they lose 70% of the potential benefits," said James Jeswald, manager of procurement material information system at the Aluminum Company of America (ALCOA) in Pittsburgh.

ALCOA's procurement department, for example, is currently

(continued on page 8)

Union Pacific employs ANI to lay claim to rail market

By Bob Wallace
Senior Editor

ST. LOUIS — Union Pacific Railroad, an ISDN pioneer, has used its experiences with the technology to create a two-tiered application designed to help it retain customers in the fiercely competitive rail industry.

The railroad has taken a common Integrated Services Digital Network telemarketing application one step further by using automatic number identification (ANI) to identify callers whose attempts to reach agents at the railroad's national customer service center here fail. The agents can then call the customer back.

The center, one of the nation's largest customer service operations, has 300 telephone agents,

receives roughly 16,000 calls a day and is open around the clock, 365 days a year. About 74% of all calls delivered on three ISDN Primary Rate Interface (PRI) lines come with ANI.

During traffic peaks, when agents are already processing orders and customer inquiries, Union Pacific's Rockwell Telecommunications, Inc. Galaxy automatic call distributor (ACD) captures the ANI of calls that receive busy signals and of calls on hold that are disconnected before an agent can answer.

When traffic subsides, the ANI information and accompanying customer profiles are passed to agents. The agents then call back customers and take their orders.

(continued on page 6)

Nynex service lets users link sites at T-1, T-3 speeds

SMDS provides an alternative to dedicated lines.

By Barton Crockett
Senior Editor

WHITE PLAINS, N.Y. — Nynex Corp. last week announced plans to offer a new high-speed switched digital service that could offer users greater flexibility to interconnect multiple locations at T-1 or T-3 speeds.

Called Switched Multimegabit Data Service (SMDS), the offering will allow carriers to transmit data at 1.544M bit/sec or 45M bit/sec speeds between user locations with dedicated access to the local exchange.

Once at the local exchange, transmissions can be routed between multiple SMDS switches without dedicated leased lines. Instead, bandwidth is supplied on demand.

Nynex said that under SMDS, traffic can be transmitted between sites within its region or across the country by carriers that support SMDS.

Service to debut in 1991

Nynex, based here, said it plans to begin offering SMDS service in the second half of 1991. Pricing has not been set.

A spokeswoman said the carrier is seeking beta users in the Boston and New York metropolitan areas for the first half of 1991. Nynex is currently testing a prototype SMDS switch made by AT&T, which plans to sell SMDS switches commercially.

Walter Johnston, director of the prototype services laboratory

(continued on page 6)

Briefs

Headin' south. MCI Communications Corp. last week announced plans to interconnect its network with the network run by Mexico's national carrier, Telefonos de Mexico, S.A. de C.V. (TelMex) and to work with the carrier to provide advanced services. Among the services MCI will offer in conjunction with TelMex are dedicated private lines between the U.S. and Mexico, transborder 800 service and toll-free access to international operators. A spokeswoman declined to specify pricing but said that most of these services should be available by the end of 1990. The two carrier networks will be interconnected by fiber-optic cables at four points along the Mexican and U.S. border.

OpenView for Unix due out. Hewlett-Packard Co. is expected to introduce a Unix-based version of its OpenView integrated network management software later this month, according to sources close to the company. The new version will contain the software modules needed to build integrated network management applications that enable users to monitor and control HP and non-HP equipment from a Unix-based device.

The making of a yardstick. Andersen Consulting is offering network executives that have an annual information technology budget of \$25 million or more the opportunity to weigh their financial efficiency against the performance of similar companies through its Techmetrics 1990 survey. The survey will run down a detailed list of expenditures by function for each company — including

computer operations, applications delivery, telecommunications and end-user computing — and provide survey participants with a final analysis of overall information technology performance. Included in the final report will be a range of responses and averages for each performance measure. Last year's survey pegged average expenditures, excluding labor costs, at \$82,000 per employee. The fee for participants is \$7,500. Interested firms can obtain more information by calling (713) 237-2527 through Jan. 15.

Manager exodus. AT&T said last week that more than 12,500 managers retired on Dec. 30 as a result of a special early retirement incentive it instituted in October. The group represents the largest number of supervisors to leave the company in a single year. AT&T said an additional 1,000 managers may retire by April 1. The plan was designed to trim management ranks by 5,000 to 25,000 people. Under regular conditions, 200 AT&T managers retire each month. Most of the retirees had logged 25 years of service for AT&T, a spokesman said.

Pacific Telesis to slim down. Pacific Telesis Group last week said it plans to reduce its 69,000-person work force by 11,000 employees over the next five years to cut costs. The job cuts will be made mainly through early retirement offerings, outplacement programs and attrition. Both management and nonsalaried positions will be eliminated under the program. The cuts will occur primarily at Pacific Telesis' Pacific Bell operating company.

CONTENTS

Industry Update

As membership in users groups swells, vendors are establishing smaller, more closely knit user advisory councils. **Page 9**

Telecommunications

Users may see the cost of T-3 circuits rise or fall within the next year as the result of a ruling issued by the FCC last month. **Page 11**

Data Communications

National Westminster Bank extended its private T-1 net so it can use public network facilities to merge operations. **Page 15**

Local Networking

The infant LAN industry of the early 1980s reached adolescence by the decade's end. Although more mature, the industry is still growing fast. **Page 17**

Management Strategies

Top information executives say their primary responsibility is to integrate information technology with business objectives — but many aren't handling that responsibility very well. **Page 19**

International Networks

For most midsize American companies, relying on public data networks to communicate with Europe is more than twice as expensive as using a dedicated circuit. **Page 21**

Products & Services

Engage Communication unveiled a router that connects AppleTalk LANs over high-speed synchronous lines. **Page 23**

Inside

Opinions **24**

Letters **25**

Networking Marketplace **45**

Networking Careers **46**

Network World wants you. If you have a news tip, please contact us. We'd also like to hear about unusual network applications and how you're optimizing your networks for performance or savings. Contact Editor John Gallant at (800) 343-6474, ext. 722, or through MCI Mail at 390-4868.

Network World
161 Worcester Road
Framingham, Mass. 01701
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World Publishing/Inc., 161 Worcester Road, Framingham, Mass. 01701.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-620-7760.

Non-qualified subscribers: \$3.00 a copy; U.S. — \$95 a year; Canada, Central & South America — \$110 a year; Europe — \$165 a year, all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus 50 cents per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World*, 161 Worcester Road, Framingham, Mass. 01701.

Copyright 1989 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.



Reprints (minimum 500 copies) and permission to reprint may be purchased from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701.

NEED REMOTE ACCESS TO YOUR 3270 NETWORK? WE HAVE A SMALL SUGGESTION!



The Informer 213 portable terminal.

The only light weight 3178 compatible terminal designed specifically to provide remote access to your IBM 3270 environment. Nothing offers you a more complete solution.

This compact little eight pound powerhouse includes a built-in synchronous modem that operates up to 9600 baud and emulates a 3274 control unit with an attached 3178 Mod 2 terminal. Making communications to the host computer as simple as plugging into any RJ-11 phone outlet and striking a single key.

The Informer 213 lets you establish a low cost dial-in network over standard or leased lines with the data integrity of SNA protocols.

So you'll always feel at home when you're away, we

designed the 213 to perform and feel just like your 3178 terminal. From the detachable 3270 compatible keyboard, to the electroluminescent 80 character by 25 line screen with status line. It's all there.

If you've been looking for a portable 3270 solution that's as strong on communication as it is on compati-

bility, give us a call at (714) 891-1112.

We think you'll be surprised when you see what a great little suggestion the 213 really is.

INFORMER[®]
Computer Terminals, Inc.

Informer Computer Terminals, 12781 Pala Drive, Garden Grove, California 92641.

Informer is a registered trademark of Informer Computer Terminals, Inc.

IBM is a registered trademark of International Business Machines Corporation.

Users seeing benefits of employing imaging wares

Despite large capital outlay, users hail products.

By Tom Smith
New Products Editor

Early users of imaging products are praising the technology, saying it improves customer service and streamlines information processing by reducing and eventually eliminating paper-based transaction systems.

Despite prices typically starting at about \$750,000 for a turn-key system, users said imaging can provide cost benefits, including the ability to eliminate jobs or redeploy workers that perform tasks such as data entry, filing and mail sorting.

In typical configurations, the imaging equipment — which consists of an image processor, software, scanners and storage devices — operates as a subsystem on a network supporting mainframe applications.

Users at intelligent workstations tied to the mainframe network often emulate IBM terminals to access a data base containing information about stored images and then use that information to access the image.

The technology has already paid off handsomely for some early users.

Raytheon Co.'s Missile Systems Division, for instance, last week said it has decided to imple-

ment imaging in its Andover, Mass., plant to make the 250,000 documents it receives from vendors each year more accessible to employees.

The company plans to install a Wang Laboratories, Inc. Wang Integrated Image System (WIIS), which will be operational by the end of the second quarter. WIIS will enable Raytheon to more efficiently index and maintain procurement files. Previously, it could take hours to locate such files.

Users on seven workstations outfitted with imaging hardware and software will access information about stored documents from an IBM mainframe. Once that data is available, the mainframe will instruct WIIS software running on a VS minicomputer to locate the related document and download it to the workstation.

"If the government wants to do an audit, they can come in and look at our documents," said Bob Sexton, information processing systems manager at the Missile Systems Division. "Having an imaging system [lets] you produce these documents quickly."

At the Florida Department of Education's Bureau of Teacher Certification in Tallahassee, another WIIS that went on-line in

December has slashed the time it takes employees to access information, such as teacher transcripts, from as long as 15 minutes to as little as 10 to 15 seconds, according to Donald Griesheimer, chief of the bureau.

"The rapid access this gives us to information will help us be more efficient and reduce complaints we get through the certification process," Griesheimer said. Complaints typically focus on long waits for responses to requests or the inability to locate files.

Though potential cost savings from the \$1.5-million system have not been determined, Griesheimer said the bureau's imaging system will reduce the need to hire temporary help to maintain files; it will also cut down on the 8,000 feet of storage dedicated to paper-based files.

Imaging also promises to streamline transaction-handling at Lincoln National Corp., a \$23 billion insurance holding company based in Fort Wayne, Ind. The user has implemented imaging in an indemnity claims unit and will use the technology in 11 other units by the end of 1990.

By scanning incoming claim-related correspondence as it arrives, Lincoln National will give claims representatives near-immediate access to information they need to serve customers, rather than requiring them to wait until the claim has been routed to them, which takes a minimum of 24 hours.

(continued on page 8)

DEC to supply Aetna with servers for Macintoshes

By Tom Smith
New Products Editor

MIDDLETOWN, Conn. — Aetna Life Insurance Co. last week said it awarded Digital Equipment Corp. a contract to install and maintain a network of MicroVAX 3400s to provide Macintosh workstations with local file and print services, as well as ties to IBM hosts.

Aetna's Employee Benefits Division will use 30 MicroVAX 3400s as servers for some of the 1,000 Macintosh II CXs, SEs and

cause Ethernet interfaces are not offered for the Portable.

Aetna will use a Novell, Inc. Kinetics FastPath 4 gateway to tie the AppleTalk networks into the MicroVAX servers, according to a company spokeswoman.

The MicroVAX servers will also likely sport an IBM 3270 gateway, enabling Macintosh users to set up IBM 3270 emulation sessions to communicate with hosts, the spokeswoman added.

Macintoshes in field offices currently communicate with central-site mainframes via Netway, a Systems Network Architecture gateway from Tri-Data Systems, Inc. of Santa Clara, Calif. Netway emulates an IBM cluster controller. Field offices will share electronic mail and other data with one another through TeleBridge, an AppleTalk bridge manufactured by Shiva Corp.

Once the MicroVAX 3400s are operational, the Macintosh workstations will communicate with one another over DECnet; those offices without MicroVAX 3400s will need to use the TeleBridges for Macintosh connectivity. The TeleBridges will also remain in use in every office so employees can gain dial-up access to the Macintoshes while on the road.

DEC described the contract as a multimillion-dollar order, but Aetna declined to disclose its value. The contract allows Aetna to focus on its core insurance business while DEC performs service and maintenance of Apple, DEC and third-party equipment, said another spokeswoman, who is in the division's marketing information management department. ■

The contract lets Aetna focus on its core insurance business while DEC performs service.

▲▲▲

Portables being installed in 72 field offices across the country in an effort to put intelligent workstations on every desk. The Macintoshes will replace IBM 3270 terminals and cluster controllers.

At sites with a MicroVAX server, the minicomputer will support two separate local-area networks — an Ethernet and an AppleTalk — and will provide file, print and data services to users on both networks.

Macintosh II CXs will reside on the Ethernet, while Macintosh SEs, which will likely be replaced by Macintosh Portables, will be placed on an AppleTalk net be-

Avis planning net shift to remote distributed systems

Car rental co. puts out RFP to replace remote office terminals with new stand-alone systems.

By Jim Brown
Senior Editor

GARDEN CITY, N.Y. — Avis, Inc. recently issued a request for proposal in which it asks 55 different vendors to serve up plans to add distributed processing systems to its remote rental locations.

In its Wizard IV project, the company intends to replace IBM 3270-type terminals and associated IBM cluster controllers in car rental offices with intelligent workstations or multiuser systems supporting dumb terminals.

Those systems would support gateways that link each remote site on its Wizard reservation network to IBM 3090 mainframes here. Wizard is based on IBM's Systems Network Architecture.

Replacing the host-dependent 3270 terminals and cluster controllers with stand-alone distributed systems will help improve customer service by enabling agents to continue generating car rental agreements electronically even if the host fails, said Peter

Tittler, Avis' vice-president of operations.

Currently, agents must prepare those documents manually when the terminal loses contact with the host.

Avis also plans to develop software that will enable it to download host data files containing customer reservation records, rental rates and car availability data to its rental offices at various times each day.

This will eliminate the need to consult the host for individual reservation records as they are needed, thus preserving network bandwidth at peak transaction periods. It also will eliminate the need for Avis agents to have paper backup rate and car availability tables at each office.

Avis invited computer manufacturers, software designers and electronic system suppliers to its headquarters here last month to state the objectives it is setting out to meet in Wizard IV. Each vendor will be given until early February to file a proposal. Avis

hopes to award the multimillion-dollar contract by the third quarter, Tittler said.

Creativity encouraged

Avis intentionally did not specify a particular technology to meet its objectives in order to obtain as many proposals as possible, Tittler said.

"We've left it open because we simply feel people may have a lot of tricks up their sleeves that we haven't heard about or that haven't been announced yet," he said. "I expect that we will see people who propose PCs hooked together through token-ring or Ethernet, we'll see people propose Unix boxes with terminals, and we'll see people who propose proprietary systems."

Tittler said Avis relies too heavily on host processing facilities and that a distributed processing architecture will enable it to shift processing chores to remote sites.

Currently, Avis' Wizard network uses cluster controllers in each car rental and administrative office to link terminals over lines operating at up to 14.4K bit/sec to either an IBM 3720, 3725 or 3745 front-end processor in a regional concentrator site. Those front-end processors are linked via lines operating at up to 56K bit/sec to one of two IBM 3090s in the data center here. ■

AT&T weaves local-access facility support into BMS

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — A recently announced enhancement to AT&T's Bandwidth Management Service is expected to increase use of the service, which has attracted only a few customers to date.

Cigna Corp., the first user of the enhanced service, which is called Bandwidth Management Service-Extended (BMS-E), praised the development and has already deployed it throughout its 12-node, nationwide T-1 data network.

While BMS enabled customers to reconfigure AT&T wide-area T-1 nets, BMS-E expands management capabilities to include local-access facilities.

In 1988, Cigna began migrating its difficult-to-manage, point-to-point T-1 data network to a BMS-based net that included in-

telligent T-1 multiplexers collocated at AT&T central offices.

Cigna uses BMS to control and reconfigure T-1 circuits emanating from AT&T central offices in Atlanta, Chicago, Dallas, Denver, Hartford, Conn., Los Angeles, Orlando, Fla., Philadelphia and Phoenix.

With BMS-E, it can now control and reconfigure T-1 access lines and Tellabs, Inc. 745 intelligent T-1 multiplexers located at its Connecticut, southern New Jersey and Colorado data centers.

"Before BMS-E, if you lost a T-1 access line and had to have operators manually patch a T-1 between a data center and a local BMS node, you were nowhere," said Rich Batchelder, Cigna's director of network planning.

Cigna uses multiple T-1 lines to connect each data center to the closest central office-based mul-

(continued on page 7)

HOW TO TELL A CLEVER X.25 FROM A NOT-SO-CLEVER ONE.

If you're a network manager, you can't do any better than the system you manage.

That's why you need a clever X.25 network by your side. One

that will streamline your work, make it easier. The way MICOM's X.25 does.

Its intelligence, not surprisingly, stems from its brain: our XNMS network management system.

It gives you intuitive color displays of your entire network's condition. Displays that are in *real time*. Together with a hot-key functionality between program levels, that helps you to move quickly from finding problems to fixing them.

Besides configuration and fault management, our XNMS gives you performance monitoring and call accounting. While it automatically generates comprehensive reports on all activities in the network.

But MICOM's X.25 intelligence doesn't end there. We

have a complete line of X.25 equipment (PADs, packet switches and bridge-routers) all bright enough to connect a wide range of products and protocols:

Async, Bisync, SNA, HDLC, X.25, FAX, even multiple LAN networks.

Any X.25 network that can't do these things for you unfortunately falls into the not-so-clever category.

So when it's time to choose, pick an X.25 system with brains. From a company that has nearly two decades of success linking everything from simple point-to-point systems to complex networks.

In other words, MICOM.

After all, a clever network manager deserves a clever network.

FREE X.25 SEMINAR.

Learn what MICOM's powerful X.25 systems can do for you at an intensive, day-long seminar. Call 1-800-MICOM U.S.

MICOM[®]
NETWORKING SOLUTIONS

See the FAXNeT Form on Page # 39

Pan Am steers course with net

continued from page 1

leigh, N.J., data center and Token-Ring Networks in airports.

The X.25 net, which will be based on Telematics International, Inc. switches sold to Pan Am by Racal-Milgo, will be installed in 11 nations and linked using leased facilities at speeds up to 56K bit/sec.

"The nature of our business has made telecommunications highly strategic for Pan Am," said Al Castan, system director of communications here. "We're going into this with full force."

The network will make it possible to download host-based reservation files to LAN servers in airports. When a passenger checks in, an agent using a LAN-attached microcomputer will retrieve the passenger's reservation file from the server.

The agent will then request the remote host to download a unique baggage number for the

passenger's luggage, which will be entered into the passenger's file and printed on a baggage tag.

Token-Ring-attached scanners will read bag tags as they are put in containers to be loaded onto the airplane and add the container number to the passenger file. The passenger's boarding pass will have a magnetic strip containing passenger and flight information. At the gate, that pass will be inserted into a network-attached card reader, which will update the passenger file on the server showing that the passenger boarded the airplane.

"The passenger will experience a shorter interaction at check in," Castan said. "At the same time, it will provide us with an audit trail for passengers."

The audit trail will enable Pan Am to determine which passengers did not board and enable it to unload their baggage as a se-

curity measure.

The LANs will also obviate the need for agents and baggage handlers to manually enter information into the system.

The LAN-attached microcomputers will replace a mix of terminals and protocols used today. Current reservation and check-in terminals communicate with an IBM host using the Airline Link Control protocol, which was developed by the airline industry.

Flight operation applications are supported today with IBM 3270-type terminals and the Synchronous Data Link Control protocol. Pan Am also uses an asynchronous protocol to transmit messages to teletype terminals.

The X.25 net will replace the existing point-to-point net that uses time-division multiplexers and circuits operating between 4.8K bit/sec and T-1 speed. "The packet-switch network will permit us to achieve a higher level of optimization" and save on transmission costs, Castan said. ■

Union Pacific employs ANI

continued from page 2

The railroad installed the ANI callback application because it calculated that it costs less to meet peak traffic demand using existing agents to call customers back than it would to add more agents. Union Pacific's telephone agents perform about 50 callbacks a day, Meadows said.

"In this business, you can't afford *not* to call back your accounts. We're using ANI to get back to customers that otherwise may have taken their business to competitors," Meadows said.

In the current configuration, the ANI is passed from an AT&T 4ESS central office switch in the carrier's St. Louis switching center over the D signaling channel of the PRI link to the Galaxy ACD at Union Pacific's customer service center.

The Galaxy formats the ANI information into three types of messages: an arrival record, a connection record and a disconnection record, Meadows said. The arrival record includes the ANI, the trunk the call is coming in on and the dialed number iden-

tification service (DNIS) code, the last four digits of the 800 number the customer called.

The ACD passes the arrival record to Union Pacific's IBM mainframe, which begins the task of matching the ANI to a customer profile and a connection record to the mainframe telling it to which agent the call is being transferred. The mainframe pulls the terminal code for that agent and transmits the file to the CRT.

But if the caller hangs up before reaching an agent, the mainframe does not receive a connection record. Instead, it gets a disconnection record for the trunk the call came in on and considers the call abandoned.

If the mainframe matches the ANI to the customer profile, it ships the screen full of data, based on the DNIS code, to the manager for that region.

The manager pulls the contact name from Union Pacific files and passes the profile, which contains details on the customer's last two transactions, the agent who handled them and the customer con-

tact name, to the first available agent for a callback.

"If we can't match the ANI with a profile, we don't even consider doing a callback. We don't want our agents calling companies back and asking who just called Union Pacific Railroad," Meadows explained.

"But if Ford Motor Co. calls us and drops off, and we pull their profile, an agent will call them back and say, 'We're sorry we couldn't help you when you called, but we *do* want your business,'" Meadows said.

The enhanced application was built on a foundation of early learning experiences with ISDN.

The center began using ANI in late 1988 to provide customers with personalized greetings. It eventually abandoned that practice, however, because agents were spending eight to 10 minutes explaining to surprised callers how they knew who they were.

Today, the firm masks the use of ANI with generic greetings. "It's nice to have a new technology, but you have to find a way to make it pay off," Meadows said. ■

CSX unfolds plan for net move

continued from page 1

But IBM's announcement last May of the 3745 Communication Controllers, which are geared to support Token-Ring Nets and T-1 links, presented a far less expensive and more strategic option ("IBM overhauls 3174, broadens 3745 line," *NW*, May 8).

CSX paid about \$125,000 for a pair of 3745 Model 130 front ends, which includes the cost of some host channel attachments that will be used only temporarily, said Doug Register, director of data systems engineering for CSX Technology.

Besides offering a lower initial investment, the 3745/Token-Ring configuration will enable CSX to use only two T-1 lines to link the sites, Register said.

According to IBM, "The protocol is much more efficient on the Token-Ring than the protocol of the channel itself," Register said. "It's proving to be true."

Until the conversion to Token-Ring began last October, CSX's controllers were channel-attached to its complex of four IBM 3090 mainframes.

A simulation session at IBM in Raleigh, N.C., showed the Token-Ring and T-1 configuration, using IBM's new front-end processors, would yield response times simi-

lar to that of channel-attached controllers but for much less money, Register said.

That simulation has since been proved in in-house tests using a mock up of the ultimate configuration. Legent Corp.'s NetSpy, a response time measurement product, showed a network delay of only .2 or .3 second, he said.

The company is more than halfway through installing and testing 3174 Model 13R controllers on a Token-Ring backbone.

The adapter cards in the controllers support both the 4M and 16M bit/sec versions of IBM's Token-Ring, although the company cannot use the higher speed net
(continued on page 41)

X.25 service provider plans to build South Korean net

By Barton Crockett
Senior Editor

SEOUL, South Korea — South Korea's public data network service provider, Data Communications Corp. of Korea, last week announced plans to erect a new X.25 network spanning the country.

The network, which will be based on packet-switching equipment from Telenet Communications Corp., promises to significantly enhance the quality of South Korean X.25 services. Data Communications' existing public packet-switching network is based on a hodgepodge of vendors' equipment and has been criticized for providing poor service.

"Right now, they have a total of about five or six [different network management systems for various packet switches], which makes the cost of the network high and reliability low," said Ken Rice, regional director of international system sales with Telenet parent US Sprint Communications Co.

Woo Han Kim, manager of engineering at Data Communications, said that standardizing on Telenet equipment will let the carrier develop "more comprehensive and intelligent" network

management and improve network reliability. He added that for the first time, it will let the carrier support IBM Systems Network Architecture protocols, such as Synchronous Data Link Control.

Users with operations in South Korea hailed the effort.

"Let me tell you, anything they do has got to be an improvement," said Lonnie Jones, a senior telecommunications analyst at a Fortune 100 company with operations throughout Asia. "With the service they've got now, the country's a disaster area."

Data Communications plans to erect the new network over a six-month period. The carrier plans to install 25 of Telenet's most advanced TP4 packet switches and 36 of the company's TP3325 packet assembler/disassemblers. Switches will be located at nine user access nodes throughout the country, including such cities as Seoul, Kwangju and Inchon. They will be interconnected by dedicated 56K bit/sec circuits. In addition to IBM SDLC traffic, the network will support asynchronous and Binary Synchronous Communications protocols.

(continued on page 7)

Service lets users link T-1, T-3

continued from page 2

at Nynex, said the company is targeting several applications for the technology. Initially, customers will use SMDS to interconnect multiple local-area networks. Doing this with dedicated facilities can be prohibitively expensive, Johnston said, and SMDS will most likely offer a more economical alternative.

He also said the service could be used by government contractors, which often team up for short periods of time to bid on contracts and frequently run network applications, such as computer-aided design, that eat up large amounts of bandwidth.

These companies typically don't work together long enough to make buying dedicated links between one another economical, Johnston said.

SMDS bandwagon

In announcing its intention to supply SMDS, Nynex joined the coterie of carriers jumping on the SMDS bandwagon. Last month, Pacific Telesis Group and BellSouth Corp. said they plan to start selling SMDS services in 1991 and 1992, respectively.

Each of the seven regional Bell holding companies have voiced their support for the technology through Bell Communications Research and a carrier organization called the SMDS Early Avail-

ability Task Force. Interexchange carriers are also expected to offer SMDS within the next two years.

The SMDS services that carriers plan to offer are based on a BELLCORE standard finalized late last year. The standard specifies how customer premises equipment can access an SMDS switch using twisted-pair wiring or fiber-optic cables to support T-1 speeds and fiber-optic cable to support T-3 speeds. The BELLCORE standard is based on the IEEE 802.6 standard.

At present, carrier officials say the SMDS standard can only be used to support data and video, but not voice transmissions.

For users to access a carrier's SMDS network, they must use customer premises equipment that supports SMDS interface protocols.

Steve Starliper, project manager of metropolitan-area networks at Pacific Telesis, said he does not know of any customer premises equipment vendors that support SMDS. He added, however, that he expects SMDS-compliant equipment will be available once Pacific Telesis begins selling the service in 1991.

Starliper said most major telephone switch makers plan to sell SMDS switches. He added that interexchange carriers will likely wait until 1992 to offer SMDS. This is because a standard for sending traffic between different manufacturers' SMDS switches will not be finalized until then. ■

AT&T weaves local-access support

continued from page 4

tiplexer. The on-site BMS node automatically reroutes traffic from a failed T-1 to spare channels on a another T-1 access line. Before BMS-E, this function could only be supported on T-1s between central offices.

Announced in April 1988, BMS is a bandwidth management offering that enables users to reconfigure T-1 links using on-site terminals and to program automatic reconfigurations based on the time of day or the day of the week.

But one major shortcoming of BMS as initially introduced was that it only worked with T-1 multiplexers made by Tellabs — the type of equipment AT&T had installed in its central offices to support the service. To make the service compatible with other types of equipment, in 1988, AT&T published a specification describing the supervisory data link (SDL) the multiplexers used to exchange information.

But publishing the SDL specification did not spur vendor interest. "Any vendor can enter this market and make premises prod-

ucts that can talk to the BMS network," said Matthew Clark, product marketing manager for AT&T's Accunet High-Capacity Services. "But there have been no takers. There are no other BMS products on the market."

Analysts praised AT&T for enhancing BMS but said the service would have attracted a far larger following had it been introduced in the mid-1980s.

"The enhancement certainly makes BMS a better offering and will help AT&T sell [public] and some hybrid T-1 networks, but it only brings BMS up to the level of proprietary multiplexing," said Mark LaRow, a senior manager with Network Strategies, a Fairfax, Va.-based network

consultancy of Ernst & Young.

Users whose private T-1 networks are based on other vendors' equipment will not trade their nets for BMS-E, according to LaRow. "But, if AT&T had BMS four or five years ago, they would have taken the T-1 industry by storm," he added.

Nonetheless, Cigna and AT&T say enhancing BMS will give the service a shot in the arm. "BMS-E opens up networking capabilities to far more users. There will be more people interested in BMS-E than there ever were in the plain vanilla BMS," Batchelder said.

BMS-E was the first enhancement announced since the service was launched in April 1988.

Industry analysts have cited the high price of the service as a reason for its limited acceptance. The BMS system controller,

the computer that runs the network management software, carries a onetime installation fee of \$500 and a \$4,000 monthly charge.

The BMS node controller, the Tellabs multiplexer located at each AT&T serving office in the customer's network, carries a \$1,000 onetime installation fee and a \$2,600 monthly charge. The customer must also pay a \$400 onetime installation fee for every port used. Long-term contracts and volume pricing plans can be used to reduce these fees.

"AT&T understands that BMS is expensive. I think we'll see AT&T reduce these charges in the first quarter of this year," Batchelder said. "They've been very aggressive in pricing their other facilities; I expect the prices will come down quite a bit in 1990." □

X.25 service provider plans to build net

continued from page 6

Rice valued the deal at \$8.6 million and said it could rise to \$25 million over the next three years as Data Communications expands its packet-switching network.

Several users said that network service could be further improved by the emergence of competition in the country. Last spring, South Korea's Ministry of Communications issued a directive saying that users will be allowed to build private X.25 networks for the first time this year and that other vendors will be able to offer X.25 services in competition with Data Communications.

A consultant with close ties to the South Korean government said that both IBM and Electronic Data Systems Corp. want to sell value-added network (VAN) services in the country. He said South Korea agreed to allow competition in part to appease those vendors, which were pressing the U.S. to make South Korea open up its VAN market.

Last year, the U.S. rebuked South Korea for engaging in what were deemed unfair trading practices and consequently slapped tariffs on telecommunications gear from the country's major manufacturers, which were said to be dumping equipment into the U.S. at below-cost prices.


Users and consultants expressed optimism that the entrance of new VAN suppliers might improve network service and cut communications costs in the country.

Rice said this has already happened, claiming that Data Communications purchased the Telenet equipment mostly to prepare for the onslaught of competition.

But users cautioned that competition is not likely to spur the same cost cutting and service improvements in that country that it has caused here. Rice said the ministry of Communications is planning to limit competitors to only supplying communications service to users in specific industries. Several observers said this limitation will be used to keep competition from escalating to a level that will make Data Communications uncomfortable.

"Sure, competition will increase," Jones said. "But my reading is that the ministry will use this restriction to make sure it doesn't get out of hand." □

NETWORK DATAMOVER: THE FIRST REAL BREAKTHROUGH IN FILE TRANSFER.



**Move data freely
among MVS,™ VM,™ VSE,
VMS,® Tandem®
and PC environments.**

If you've had it with the hassles and hazards of traditional file transfer methods, now's the time to do something about it. With Network DataMover, you can serve all your environments at once with a single, easy, proven solution.

NDM™ provides a comprehensive answer to the limitations and labor costs of other data transfer methods. It supports direct file-to-file transfers between all major file types and all major operating environments — from IBM® to DEC®, mainframe to PC. And it enables you to automate your production activities along with your file transfers.

With Network DataMover at your key installations, file transfer ceases to be a problem and becomes a powerful basis for meeting a broad range of system-wide needs. From disaster recovery and workload balancing to software distribution and electronic data interchange, NDM opens up a world of new options while complementing your existing system software investment.

Find out more about the file transfer breakthrough you've been waiting for. Call or write today:
Systems Center, Inc., 1800 Alexander Bell Drive,
Reston, Virginia 22091.

800-562-7100 703-264-8000
H-NWX-900108

**SYSTEMS
CENTER**
A NEW YORK STOCK EXCHANGE COMPANY

NETWORK DATAMOVER PRODUCTS NETWORK ADMINISTRATION PRODUCTS VM SOFTWARE PRODUCTS RELATIONAL DATABASE PRODUCTS

© Copyright 1989
Systems Center, Inc.

Network DataMover® is a registered trademark and NDM™ is a trademark of Systems Center, Inc. IBM® is a registered trademark and MVS™ and VM™ are trademarks of International Business Machines Corporation. Tandem® is a registered trademark of Tandem Computers, Inc. DEC® and VMS® are registered trademarks of Digital Equipment Corporation.

Users merge EDI, existing applications

continued from page 2

working on several EDI integration projects. One will combine supplier responses to requests for quotes on materials issued by ALCOA. Supplier bids, transmitted by EDI, will be fed automatically into an on-line bid evaluation application. This application generates a summary report that compares all supplier bids, making it easy for managers to select the most appropriate vendor.

The integration of supplier bids into an internal application will enable ALCOA to eliminate the time-consuming clerical work now required to prepare vendor bids for top management's evaluation, Jeswald said.

"Companies that don't integrate EDI into their internal applications might as well be using electronic mail or facsimile machines to transmit documents," he explained.

Taking stock of EDI

Wal-Mart Stores, Inc. uses EDI integrated with an inventory-ordering application to eliminate the need to manually reorder much of its merchandise in its 1,400 stores nationwide. Wal-Mart, with 1,800 EDI trading partners, boasts one of the largest EDI programs in the U.S.

The department store chain uses scanning machines at the point of sale and in distribution centers to track inventory depletion accurately.

When stock levels fall below a predetermined point, computer systems in the

stores or at distribution centers generate an electronic purchase order. That order is then sent via EDI to the appropriate supplier, according to Mark Schmidt, senior director of Information Services at Wal-Mart in Bentonville, Ark.

EDI is a critical element of Wal-Mart's Quick Response strategy, which enables the general merchandiser to streamline inventory and speed the delivery of goods to stores in response to consumer demand. Wal-Mart currently uses Quick Response to order high-volume items or goods from suppliers that are extensively automated. The company will expand its Quick Response program by adding suppliers that automate their operations.

"EDI has enabled us to change the way we do business, making us more efficient and productive," Schmidt said.

But integrating EDI into existing applications is not always as easy as many companies would like.

Gregory Harter, director of finance at Cummins Engine Co., Inc. in Columbus, Ind., said successful EDI programs require a good deal of coordination among corporate departments that traditionally operate independently. They also require companies to work closely with EDI trading partners.

"EDI won't solve a company's communications problems; it will only magnify them," Harter said. "Companies need to chart and then simplify the flow of communications between departments and trading partners before implementing EDI. Otherwise, they are doomed to encounter problems."

Cummins Engine spent more than six months integrating a variety of applications used to manage customer orders, such as shipping, accounts receivable and invoicing. An interdepartmental task force at the company determined that all internal applications should use the same code number when referring to individual customer orders. In turn, Cummins' customers would use the same code number when processing the orders at their end, Harter said.

Standardizing code numbers throughout all applications eliminates the need for clerks to rekey information from one application to another, Harter said. The standardization also enables applications to automatically pass new information concerning a shipment among multiple applications without human intervention.

"EDI is the application-to-application exchange of data, not the computer-to-computer exchange of data," Harter said. "If data just flows between computers and not applications, somebody has to read, print and reenter the data, which nullifies any benefits of EDI." □

Users seeing benefits of imaging wares

continued from page 4

Lincoln National uses IBM's mainframe-based ImagePlus software; the vendor ported the software to Lincoln National's existing mainframe-based CICS application for claims payment, according to Hank Dill, assistant vice-president and director of image technology.

Users on 22 Personal System/2 workstations on two IBM 4M bit/sec Token-Ring Networks emulate IBM 3270 terminals to request mainframe data.

Lincoln National invested \$1.5 million in imaging, Dill said, noting that the investment was worthwhile. "We think it will provide us with a competitive advantage by paying claims the quickest."

In the financial services arena, The Huntington Service Co., the data processing arm of Huntington Bancshares, Inc., an \$11.5 billion regional bank holding company in Columbus, Ohio, recently decided to implement a Unisys Corp. image check processing system, which will be operational by the third quarter of this year.

By capturing electronic images of checks, the Unisys equipment will speed processing, enabling workers to key in dollar amounts on up to 2,800 checks per hour on an image-capable workstation rather than on manual encoding devices, according to Terry Geer, vice-president in charge of item processing.

With manual encoding, workers were able to affix dollar amounts to an average of 1,400 to 1,500 checks per hour. □

10BASE-T TWISTED PAIR ETHERNET & NETWORK MANAGEMENT

CABLETRON

Delivers It First.

Available Now
Call 603-332-9400
For Details

CABLETRON
systems

A New York Stock Exchange Company

Cabletron Systems, Inc.
CORPORATE HEADQUARTERS
Rochester, NH 03867
(603)332-9400 FAX (603)332-4616

FEDERAL OPERATIONS
Chantilly, VA 22021
(703)818-2980 FAX (703)818-0049

INTERNATIONAL OPERATIONS
Newbury, Berkshire, UK RG13 2PZ
(0635)580000 FAX (0635)44578

WEST COAST OPERATIONS
Santa Clara, CA 95054
(408)986-0566 FAX (408)727-4902

Other Sales and Service Locations Worldwide

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

“Fully digital fax technology has the potential to revolutionize document communications over networks as we head into the 1990s. The emergence of the Group IV standard marks *the* major step toward integrating facsimile into networks.”

Garry Waddell
Manager of facsimile
planning and marketing
Ricoh Corp.
West Caldwell, N.J.

Network Equipment Technologies, Inc. at a glance

Location: Redwood City, Calif.

1989 earnings: \$15.9 million

1989 revenue: \$136.7 million

Target customers:

1,000 largest corporate network users — 600 in the U.S. and 400 abroad.

1989 highlights:

First shipments of Expert Fault Management Service, Integrated Digital Network Exchange/10 Integrated Access Multiplexer and Series 5000 Network Management System.

Key business strategies:

- Signed marketing and development agreement with IBM in June 1987.
- In October 1989, announced formation of Adaptive Corp., an organization designed to spur development of T-3 and Synchronous Optical Network products that are compatible with existing and future NET offerings.

NETWORK
EQUIPMENT TECHNOLOGIES

GRAPHIC BY SUSAN SLATER

New NET exec maintains company's current course

Warmenhoven to speed entry into new markets.

By Bob Brown
Senior Editor

REDWOOD CITY, Calif. — Since taking the helm of T-1 market leader Network Equipment Technologies, Inc. (NET) two months ago, the company's new president has made clear that he doesn't intend to rock the boat — he just wants to make it go faster.

Daniel Warmenhoven, who joined NET as president and chief operating officer last November, said in a recent interview with *Network World* that he plans to

such as T-3 and Synchronous Optical Network.

He added, however, that it would make no sense for him to impose any major changes at NET, given the company's recent successes. NET is coming off a year in which it posted revenue and earnings gains — before taxes and an extraordinary credit — of more than 40% compared to the year before.

“Rather than me coming in and trying to put my mark on NET, I'm going to try to accelerate some of the company's growth [segments],” he said.

Warmenhoven succeeded Bruce Smith as NET's president; Smith retained his role as chief executive officer and took on the newly created position of chairman.

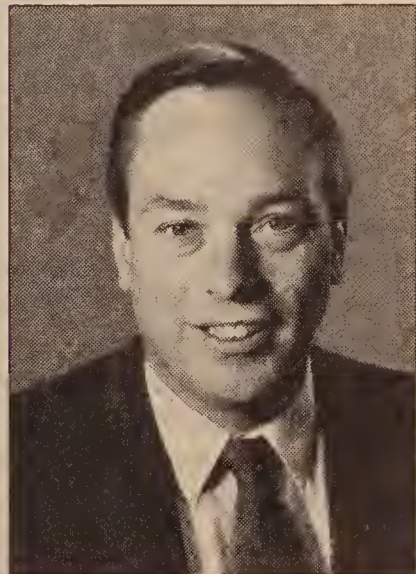
Smith will continue in his role as the corporate visionary, focusing on long-range planning and policy development, while Warmenhoven will run the company on a daily basis.

For the past five years, Warmenhoven headed the Information Networks Group at Hewlett-Packard Co. Given his connections at HP and the complementary nature of both companies' product lines, there is a good chance the two firms will engage in joint business opportunities down the road, he said.

HP and NET already have an agreement in place under which they provide coordinated network problem resolution services.

Warmenhoven said he and Smith will work together to en-

(continued on page 13)



NET's Daniel Warmenhoven

leave his mark on the company by speeding its entry into emerging growth markets that have common ties with its existing business.

LANs to WANs

Warmenhoven, for instance, is especially intrigued by the interconnection of local-area nets to one another via wide-area nets and high-bandwidth services,

Users, vendors laud net advisory councils

Tight-knit councils wield significant clout with vendors to define products and new strategies.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — As membership in users groups continues to swell, vendors are beginning to establish smaller, more closely knit user advisory councils in an effort to quickly solicit customer input about product plans.

Vendors say the smaller ranks of advisory councils — which generally consist of no more than 20 key customers from various market segments — helps them shorten time to market for new products, as well as reduce subsequent redesign and software upgrades by incorporating up front any features council members deem critical to their business.

Users invited to sit on these boards say the time and effort they contribute is usually well worth the investment because they are able to wield greater influence on product and service development than they could through users groups that draw hundreds of members.

“The vendor wins because it emerges with better products, and the users win because they finally get something they want — not products full of features they don't care about,” said Cheryl Currid, director of applied information technology at Coca-Cola Foods Division in Houston.

Already, Bull HN Information Systems, Inc., Infotron Systems Corp. and 3Com Corp. have established user advisory councils.

And Novell, Inc. and Network Equipment Technologies, Inc. — each leaders in their local-area network and T-1 multiplexer markets, respectively — said they will likely form councils this year.

Generally, user advisory boards consist of 10 to 20 customers that meet twice annually



Infotron's James Castle

for one to three days to discuss a range of issues, from product plans to long-term strategic directions.

While users groups also focus on products, their discussions are mainly about existing products and deal with applications or technology, vendors said. Confidential advisory council sessions often are a better venue to reveal new product plans or services

(continued on page 47)

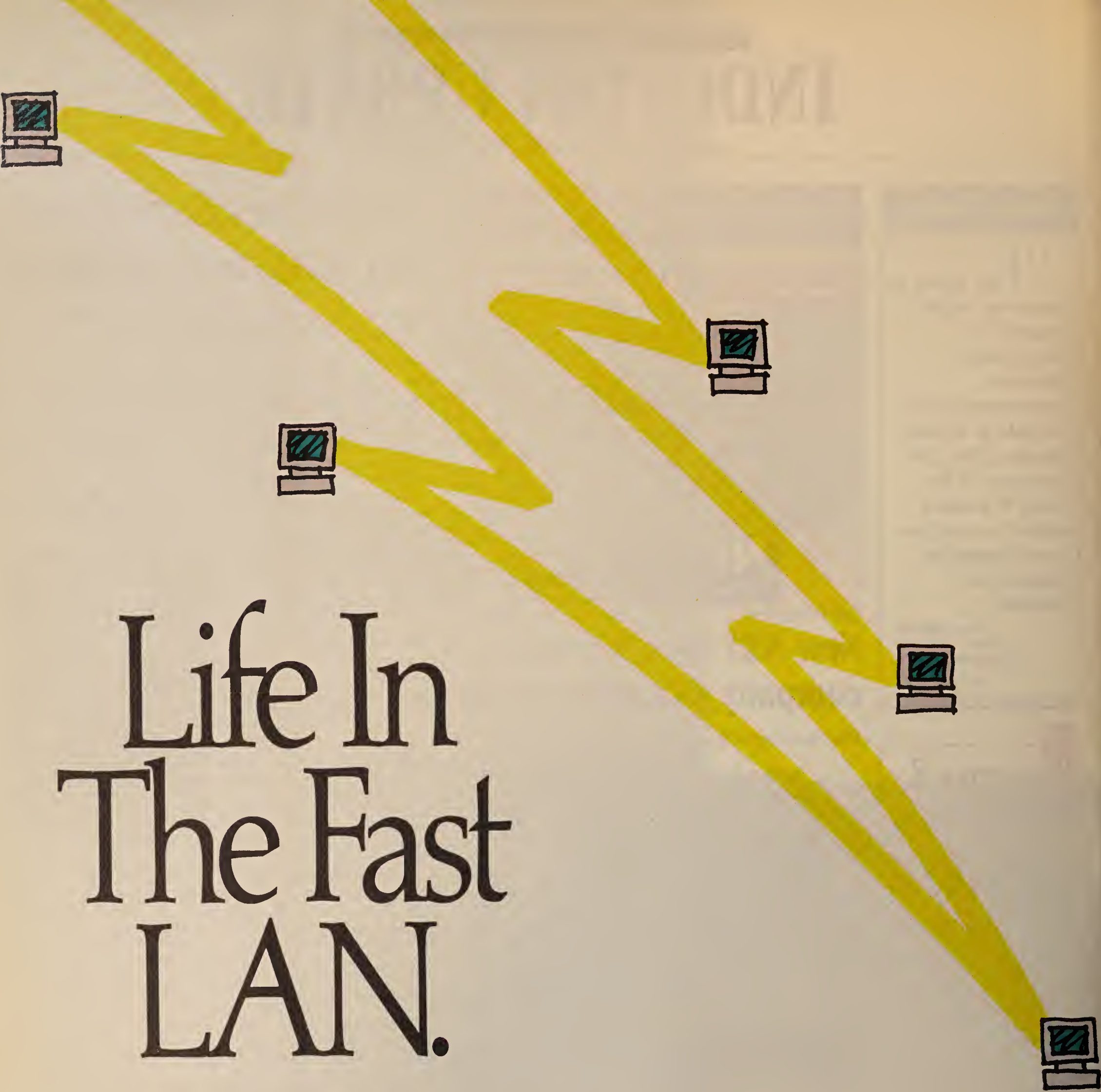
INDUSTRY BRIEFS

The Corporation for Open Systems International (COS) recently announced that Pacific Gas and Electric Co. (PG&E), a major network user, has joined its ranks as a regular member.

The utility company, which serves more than 10 million customers throughout Northern and Central California, is the 16th user company to join COS. The organization, which is a user and vendor consortium dedicated to establishing Open Systems Interconnection interoperability testing products, has about 60 members overall.

“As a major user of sophisticated computer and communications systems to monitor and manage the efficient generation and distribution of electricity and natural gas, PG&E will add a major voice to the growing user representation within the COS family,” said Lincoln Faurer, president and chief executive officer of COS.

“We hope that PG&E will be the first of a series of utility companies to join COS and use it as a forum for making their OSI and ISDN requirements known directly to the vendor community.” □



Life In The Fast LAN.

Want to see how fast our LAN boards are?

Want to see it again?

We're talking about our hot new 16-bit EtherCard PLUS16™ board. A board far, far faster than any 8-bit boards. Even faster than our own blinding fast 8-bit boards. And that's fast. Because of this awesome speed, we have higher throughput than any others currently on the market. In fact, with higher throughput than any others currently in the galaxy.

With EtherCard PLUS16, your Ethernet network will suddenly become more productive. And (if you'll pardon the use of a phrase seen in virtually every computer industry ad since the introduction of ENIAC), you'll get better price-performance from your system.

Of course, we didn't just whip out our new EtherCard PLUS16 over the weekend. It's actually the latest in a long line of network hits that includes our much-heralded and top-rated 8-bit EtherCard PLUS™ and TokenCard™ boards. Boards, as you might expect, with higher throughput than run-of-the-mill

competitive 8-bit boards.

But we're far from impartial. So don't just take our word on something this important.

Instead, take the word of those with no incentive to make outrageous claims.

Like product reviews taken straight from the pages of trade pubs whose editors are rivaled in their honesty and purity only by Snow White.

For example, Electronic Buyers' News named EtherCard PLUS the Best Add-In Board for 1988. LAN Magazine named it the Product of the Year. And PC Digest named it winner of its highest overall rating.

Naturally, all Western Digital Ethernet and Token Ring products are compatible with Novell NetWare and work lightning fast in all IBM environments.

So if you're looking for value in network boards, look for the ones named most often by the trade pubs.

Look for the ones named Western Digital.

For the name of your nearest dealer, just give us a call at 1-800-NET-LEADER.



THE
LAN
FORMS
HERE

WESTERN DIGITAL

EtherCard PLUS, EtherCard PLUS 16, and TokenCard are trademarks of Western Digital Corporation. All other marks mentioned herein belong to other companies.

See the FAXNeT Form on Page # 39

TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

Union Pacific Railroad Co. owns and operates a 850,000-route-mile T-1 network comprising fiber, analog and digital microwave links.

Carrier Watch

Southern Bell Telephone and Telegraph Co. recently retired its last electromechanical central office switch, meaning all of the 9.7 million access lines in its four-state region are switched by electronic stored-program control switches.

About 46% of the Bell operating company's access lines are served by digital central office switches, including AT&T 5ESS switches and Siemens Public Switching Systems, Inc.'s EWSD switches, according to a Southern Bell spokesman.

In related news, Southern Bell said that since beginning the deployment of Common Channel Signaling System 7 (CCS7) in June in Orlando, Fla., it has added CCS7 in Miami, Fort Lauderdale and West Palm Beach, Fla.; Atlanta, Burlington, Charlotte and Raleigh, N.C.; and Columbia and Charleston, S.C.

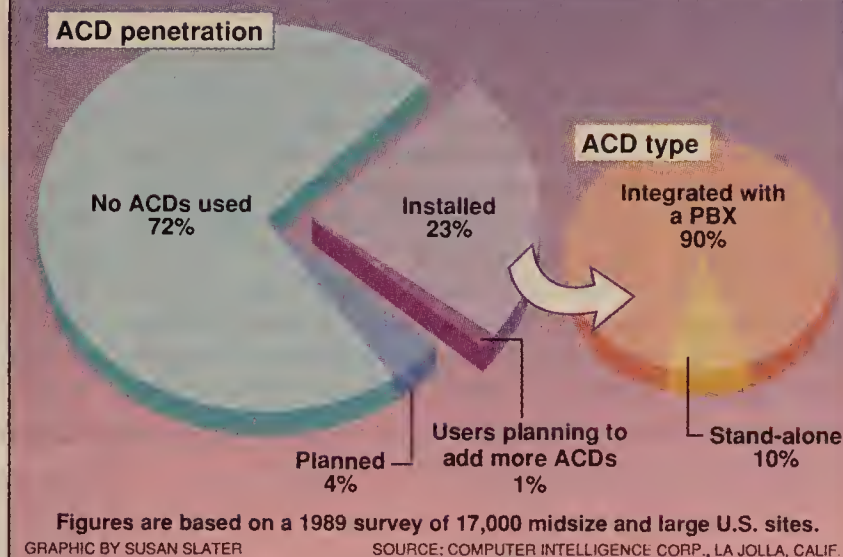
The carrier expects to have all urban areas in its territory equipped to support CCS7 by the end of 1991. Southern Bell is currently conducting CCS7 interconnection tests with **AT&T, MCI Communications Corp. and US Sprint Communications Co.**

The BOC has installed over 300,000 route miles of fiber in its interoffice, feeder and distribution plant. About 70% of Southern Bell's interoffice links are fiber, and half of its feeder routes contain some fiber.

Southern Bell is testing fiber-to-the-home to carry video signals in the Hunter's Creek development just south of Orlando and is testing integrated voice, data and video

(continued on page 12)

Automatic call distributor usage snapshot



NTN takes the wraps off new fractional T-1 service

Carrier consortium also lowers other T-1 rates.

By Bob Wallace
Senior Editor

GAITHERSBURG, Md. — National Telecommunications Network (NTN), a consortium of six carriers, recently introduced a fractional T-1 service and reduced the rates for its existing T-1 offering by about 10% to 30%.

With the introduction of fractional T-1, NTN joins a growing list of carriers offering digital transmission services in 56K and 64K bit/sec DS0 channel increments. Other carriers offering fractional T-1 services include AT&T, US Sprint Communica-

tions Corp., Consolidated Network, Inc., Litel Telecommunications Corp., RCI Long Distance, Telecom*USA, Inc. and Williams Telecommunications Group, Inc.

NTN was formed to offer a private-line alternative to AT&T, MCI Communications Corp. and US Sprint Communications Co. The consortium runs an 18,000-route-mile network comprising primarily fiber and digital microwave links.

Digital access and cross-connect systems installed at each of the carriers' main switching centers enabled the consortium to roll out the fractional T-1 offering.

Price scales

The service is priced in 56K bit/sec increments and carries a fixed monthly charge, which is calculated using three mileage bands: 0 to 51 miles, 51 to 100 miles, and 100 miles and up (see chart, page 12).

Service rates for a 112K bit/sec circuit that is 50 miles or shorter, for example, are \$110 per month and \$4.32 per mile, while circuits longer than 100 miles cost \$378 and 49 cents per mile.

NTN's fractional T-1 services also carry installation and ongoing monthly charges, including central office connection fees and access coordination fees. The consortium offers its fractional T-1 services on a monthly basis or under long-term contract. Customers that sign long-term contracts receive the following discounts: 4% for one year, 5% for two years, 6% for three years, 7% for four years and 8% for five years.

In addition to introducing

(continued on page 12)

FCC ruling changes the face of T-3 rates

With carriers filing general rates for T-3 access circuits, prices could either rise or fall drastically.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Users may see the cost of T-3 circuits either rise or fall dramatically within the next year as the result of a ruling issued by the Federal Communications Commission late last month.

After an investigation that lasted almost two years, the FCC ruled that the local exchange carriers' practice of negotiating individual prices for T-3 access circuits was unlawful and ordered contracts based on those rates to be withdrawn.

In their place, GTE Telephone Co., Southern New England Telephone Co., Cincinnati Bell Telephone and six of the seven regional Bell holding companies must file general T-3 access rates that apply to all customers.

Of the two Bell operating companies under the Pacific Telesis Group holding company, only Nevada Bell was exempted from filing general rates. This was because there is only one T-3 customer in Nevada Bell's service area and the FCC said the demand did not justify a general filing. Pacific Bell was not exempted.

The impact on users — generally large corporate users, inter-exchange carriers and alternative local-access providers — will depend largely on how favorable their previous T-3 rates were, according to carriers and analysts.

Those most affected by the FCC order are likely to be users that bought long-term contracts for T-3 service before 1989.

In 1989, the seven RBHCs filed general tariffed rates for T-3 services, which became effective even though the FCC was still investigating the legality of individual contracts.

Now that the FCC has found individual contracts to be illegal, the RBHCs will have to file new tariffs. Those rates will likely be similar to the existing tariffs, but there still may be changes since the RBHCs retained individual pricing for some elements of the T-3 service.

For month-to-month contracts signed before 1989, the RBHCs must file new rates by mid-January. Long-term contracts must be converted to general rates by January 1991.

The RBHCs had asked the FCC

(continued on page 13)

WASHINGTON UPDATE

BY ANITA TAFF

Similar, yet different. The Federal Communications Commission last week wrapped up a four-year investigation into whether AT&T could legally charge different rates for its Software-Defined Network (SDN) and Megacom services, which are provided over switched facilities. When AT&T filed its SDN tariff in March 1985, the FCC let AT&T proceed with the service, pending an investigation into whether it was sufficiently different from Megacom. The FCC ruled that the two services are technologically different and endorsed AT&T's rates as legal. If the two services had been found to be similar, AT&T would not have been able to charge different rates for the services.

The agency said that SDN can be supported only through a 4ESS switch, whereas Megacom can be supported through any switch. Also, the FCC said that AT&T uses special software and equipment to provide SDN service.

AT&T last week received approval from the FCC to expand its volume pricing plan for high-volume purchasers of its 800 service. Previously, the largest discounts went to customers that committed to monthly usage levels of \$3 million per month and agreed to pay penalties if usage fell below that figure. Under the new plan, users must commit to minimum monthly charges of only \$50,000 to qualify for the maximum discounts. AT&T also received permission to proceed with its new 800 directory assistance service, which will allow providers of 800 services to list their customers' 800 services in an AT&T data base. Listing charges will vary according to the areas served by the 800 number. ■

WTG customers start users group to voice concerns, gain knowledge

WilTug members hope to share information about applications.

By Bob Wallace
Senior Editor

TULSA, Okla. — Customers of Williams Telecommunications Group, Inc. (WTG), a long-distance carrier based here, recently formed the WilTug Users Group to strengthen their relationship with the carrier.

WilTug will serve as a forum for the exchange of information on applications and common problems. It will also enable users to influence the carrier's hardware and

software development and gain information on new products and services.

The users group will operate as a non-profit member organization and will not be incorporated. Ed Vrzal, WTG national account executive, will serve as a nonvoting WilTug member. WilTug plans to create conference, membership and technical committees and send information about the group to WilTel customers before the International Communications Association's 1990 annual conference, which is

scheduled to be held May 20 to 25.

"We formed WilTug because of the mutual interest in applications of technology and concepts, and the desire to enhance the working relationship [among] us, the users and WilTel," said Arthur Molineaux, WilTug president and bandwidth administration manager for Digital Equipment Corp. in Concord, Mass.

Harry Hirsch, WilTel chief financial officer, said the carrier will provide information and support to the users group as requested. "We welcome the kind of candid feedback the users group can provide. We will be as involved or uninvolved as [WilTug] wants us to be."

WilTug founders named a series of provisional group officers, including Molineaux. Larry Thatcher, telecommunications analyst for The Dun & Bradstreet Corp.,

was named WilTug vice-president. WilTel's Vrzal was appointed to the post of membership secretary and will also act as a liaison to the carrier. Colleen Auchter, telecommunications manager for Wang Financial Services, was named executive secretary.

WilTug "will expedite end-user feedback for the benefit of both parties," Thatcher said. "We're helping [WTG] support our ideas, which is what it wants to do."

WilTel owns and operates an 11,000-route-mile nationwide network made up of fiber that runs through old oil pipelines abandoned by WilTel's pipeline sister company. The carrier currently sells a variety of private-line services, including T-1, T-3 and fractional T-1 services.

For additional information on WilTug, contact Molineaux at (508) 371-5133. □

It's CeBIT

Without standardization the international communication of text,
images, voice and data would still be a long way off.

Time

Office and information systems · CeBIT Banking Center · Security equipment · Software, databases, management consulting · Peripheral DP equipment · Office automation · Branch-oriented solutions, microcomputers · Telecommunications · Networks · Research and technology · Computer technologies · Production data acquisition Training and personnel development.



World Center Office · Information · Telecommunications

Further information: Deutsche Messe AG, Messegelände,
D-3000 Hannover 82, Tel.: (511) 89-0, Telex: 922728, Telefax: (511) 89-3 26 26



DEUTSCHE MESSE AG, HANNOVER

NTN's fractional T-1 service

Bandwidth (bit/sec)	Mileage band	Fixed rate	Per-mile rate
112K	0-50	\$110	\$4.32
	51-100	227	1.99
	100+	378	0.49
224K	0-50	222	8.63
	51-100	454	3.98
	100+	754	0.98
336K	0-50	332	12.95
	51-100	681	5.98
	100+	1,133	1.46
448K	0-50	420	16.36
	51-100	861	7.54
	100+	1,431	1.84
672K	0-50	630	24.54
	51-100	1,271	11.32
	100+	2,146	2.77

SOURCE: NATIONAL TELECOMMUNICATIONS NETWORK,
GAITHERSBURG, MD.
GRAPHIC BY SUSAN SLATER

NTN takes wraps off fractional T-1 service

continued from page 11

fractional T-1 services, NTN reduced rates for its T-1 service. The group said the new rates are an average of 19% lower than AT&T's.

NTN T-1 prices include four elements: a monthly charge, a mileage fee determined using three bands, and monthly and one-time central office connection and access coordination charges.

NTN offers term and volume discounts to users that commit to one- to five-year contracts. A customer that signs a one-year contract and commits to a minimum revenue level of \$10,000 receives a 22% discount. Users that agree to a three-year contract and a \$200,000 minimum revenue level receive a 39% discount. Companies that sign a five-year contract with at least \$1 million in revenue receive a 52% discount. □

Carrier Watch

continued from page 11

transmission over fiber to the Heathrow development north of the city.

By 1993, Southern Bell expects to have more than one million route miles of fiber in place. The company says its Sawgrass central office, which uses fiber for all transmission, trunking and feeder facilities, is the world's first all-fiber central office.

Southern Bell has eight customers using a limited Integrated Services Digital Network offering in Atlanta, as well as the University of Florida in Gainesville and residential subscribers at the Heathrow development. □

NET exec maintains company's course

continued from page 9

sure that NET not only stays atop the T-1 equipment market, but that it "widens the gap between us and No. 2."

NET's major challenges entail venturing into emerging growth markets, retaining an entrepreneurial, small company culture in the face of explosive growth and extending the skills of its employees from traditional telecommunications to higher levels of networking, he said.

One way NET will attempt to expand into new markets is by partnering with other companies, Warmenhoven said.

NET has a successful history of forming partnerships, as it has done with IBM, Cisco Systems, Inc. and Tellabs, Inc., he said.

FCC ruling changes the face of T-3 rates

continued from page 11

to grandfather the rates used in existing customer contracts if it found the individual pricing practice to be illegal and apply general rates only to new customers.

The FCC had allowed the RBHCs to file individual rates for T-3 and some other services that had not been offered prior to divestiture and the establishment of access charges. However, the agency expected the carriers to fold the individual rates into generally tariffed price structures as the services developed.

In its order last month, the FCC acknowledged it had failed to designate a precise time frame for pricing new access services under a generalized tariff. However, "we did not anticipate that it would take five years for even the largest [RBHCs] to begin to file generally available rates for DS3 service," the agency said.

Long overdue

The change was long overdue, according to Anthony Pompliano, president and chief executive officer of Metropolitan Fiber Systems, Inc., an alternative provider of local access that was a vocal proponent of generally tariffed rates for T-3 access.

He claims that rates for different customers with similar network configurations vary by 40% to 50%. Requiring the RBHCs to file general rates will smooth out the price variances, Pompliano said.

The new price structure may be more equitable for a larger number of customers, but not everyone will fair well. Pompliano acknowledged that many users of T-3 access, perhaps the majority of users, will see rates go up under generalized tariffs.

The initial price increase will be offset, however, by a general downward trend in digital service rates and the beneficial effects of competition, he said. "Competition has done more to drive down the price of digital service than anything I can think of."

The RBHCs contend that the rates in individually negotiated contracts were not significantly less expensive than generalized rates.

As an example, Nynex Corp. said that in 1989, it filed general rates for T-3 access and gave existing customers an opportunity to switch to the new tariffs. All but seven customers in New York and three customers in New England switched to the new tariffs. Those customers remaining with their contracts purchase a total of 64 T-3 circuits, spending about \$4.3 million annually, according to the carrier. ■

Under Warmenhoven, NET will attempt to make these relationships work even better for its customers by tightly integrating its own offerings with those of its partners. Instead of just adding OEM versions of other vendors' products to its product lines, as NET now does with Cisco System's bridge offerings, Warmenhoven said he would like to see such products engineered so that they fit better into NET's architecture.

Instead of having IBM just remarket NET products, he said he would like to make NET and IBM products work better together in networks.

NET more likely will expand into many new markets without the help of third-party firms, Warmenhoven said. He acknowledged that he is "not promiscuous by nature" when it comes to partnering with other firms and warned that it is difficult to

coordinate many partnerships anyway.

The formation in October of Adaptive Corp., described by the company as an internally developed entrepreneurial venture focused on high-speed networking products, is more in line with NET's culture, Warmenhoven said.

Warmenhoven refused to give details on just how NET would enter several emerging markets, such as hybrid networking, but he made clear which markets he is targeting.

Among them is the low-end T-1 multiplexing market, where such firms as Newbridge Networks, Inc. are major players, Warmenhoven said. The move into that market is a reaction to existing customer needs more so than an effort to compete with Newbridge on its turf, he said. NET is mainly a provider of equipment and ser-

vices for large users with T-1 backbones, but it does not want to miss out on a major growth area of extending these same networks to users' smaller remote sites, he added.

"We need a cost-effective solution for our customers to expand the networks they already have," Warmenhoven said. "We haven't been particularly aggressive on that so far."

Another area in which NET is seeking to improve is overseas sales, Warmenhoven said. NET is obligated to serve the needs of its growing base of customers with international networks, he added.

"Timeplex [Inc.] is No. 1 in market share in Europe from what I understand," Warmenhoven said. "I don't understand why we can't be in that position in the very near future." ■

Network free with over 350 companies at CN'90!

ADC Telecommunications • ADACOM Corp. • Advanced Computer Communications • Alcatel Network Systems/Transcom • Allen-Bradley Communication Div. • ALLTEL Supply • Ametek Industries • AMCO Engineering Co. • Amdahl Corp. • American Communications Co. • American Computer and Electronics Corp. • American Institute • American Power Conversion Corp. • American Private Line Services • Ameritac Corp. • AMNET • AMP • ANDO Corp. • Anixter • Applied Computing Devices • Applied Voice Technology • AR Div. of Telenex Corp. • Artel Communication Corp. • Astrocom Corp. • Atelco US • AT&T • AT&T Paradyne • Avanti Communications Corp. • Barr Systems • BBN Communications Corp. • Belden Wire & Cable • Bell Components • Bell Atlantic • Bellcore • BellSouth • Bert-Tek • Berry Electronics • BICC Data Networks • Black Box Corp. • Boole & Babbage/Avant Guard • Bowmar Telecommunications Div. • BT Datacom • Business Communications Review • Bytast Corp. • Cabletron Systems • CACI Products Co. • Canadian Embassy • Canoga-Perkins Corp. • CASE/Datatel • CGM/McGraw-Hill • C-COR Electronics • Centel Federal Systems • C-TEC Communications • Chromatic Technologies • Cincinnati Bell Information Systems • Cincom Systems • CIO • Cisco Systems • Clear Communications Corp. • Clearpoint Research Corp. • CMC • COASTCOM • Codex Corp. • Coherent Communications Systems Corp. • Combyte USA • CommScope, Network Cable Div. • Communication Devices • Communications News • Communications Week • Complementary Solutions • Compression Labs • Computer Cable Co. • Computer Intelligence • Computer Network Technology Corp. • Computer Systems Products • Computerm Corp. • Computers in Banking • Computerworld • Computerworld Focus • COMSAT World Systems • Comael Corp. • ComStream Corp. • Connections Telecommunications • Contel ASC • Control Cable • Control Resources Corp. • Cordell Manufacturing • Corning Glass Works • CrossComm Corp. • Crosspoint Systems • Cryptall LP • C & S Construction • CXR Telecom/Anderson Jacobson • Cylinc Corp. • Cylinc Communications Corp. • Cylinc Corp. • Data Communications • Data General Corp. • Data Set Cable Co. • Data Switch Corp./T-Bar • Datacom Technologies • Datapro • Dataprobe • Data-Tech Institute • DCA • Develcon Electronics • DGM&S • Dictaphone Corp. • Digicom Systems • Digilog • Digital Equipment Corp. • Digital Link Corp. • Digital Microwave Corp. • Digital Pathways • Digital Technology • Digitech Industries • DMW Commercial Systems • Doelz • Dowry Information Systems • DSC Communications Corp. • Dynatex Communications • E-COMMS • EDA Instruments • EICON Technology Corp. • Electrodata • Electronic Telecommunications • Entropic Speech • E-Tech Research • Equinox • Everest Electronic Equipment • Expendata • Fairchild Data Corp. • Famous Telephone Supply Co. • Federal Computer Week • FiberCom • Fibermux Corp. • FiberOptic Product News • Fibronics International • FICOMP • First Pacific Networks • FOCUS • Forta • Franklin Datacom • Frederick Engineering • FTS/Austron • Fujitsu America • Gandalf Data • GE Information Services • General Datacomm • General Instrument, Jernold Div. • Glasgal Communications • GMP • GATC Wire, Cable & Network Products • Government Computer News • Graybar Electric Co. • GTE Corp. • GTE Specnet • Hades Electronics • Halley Systems • Hard Engineering • Helixian Laboratories • Henkens & McCoy • Hewlett-Packard • Hitachi America • Homaco • Hughes LAN • Hughes Network Systems • IBM Communications Systems • ICC Communications • IDACOM • IDG Communications • IEEE Communications Society • Integrated Network Corp. • INFD Group • Informer Computer Terminals • Infotron Systems Corp. • IN-NET Corp. • Integrated Telecom Corp. • International Data Corp. • International Data Sciences • International Microwave Corp. • InternetX • Intratec Systems • ISC Datacom • ITT Communications Services • Jupiter Technology • KAMPUTECH • Kentrox Industries • KMW Systems • Kramer Systems International • LANEX Corp. • Lanier Voice Products • Larso Corp. • Laser Precision Corp. • Lealeah DataCom Security Corp. • LEGENT Corp. • Leviton Telecom • LIQDM • Light Control Systems • Lightwave Systems • Logica Data Architects • Lucas Industries • Luxcom • M-A-COM MAC • Management Systems Designers • McData Corp. • McDonnell Douglas/Tymnet • MCI Telecommunications Corp. • Memotec Data • Metrocass • Microm Communications Corp. • Microlog Corp. • Microtronix Datacom • Microwave Networks • MIS Week • Mitak Systems Corp. • Mitsubishi Electronics America • MOD-TAP System • Mohawk Wire and Cable Corp. • Montrose Products Co. • Motorola C & E • Multi-Tech Systems • National Satellite Paging • NEC America • NEK Cable • Netcom Technologies • NetQuest Corp. • NETRIX Corp. • Network Communications Corp. • Network Design & Analysis Corp. • Network Equipment Technologies • Network General Corp. • Network Products • Network Research Corp. • Network Systems Corp. • Network World • Networking Management • Nevada Western • Newbridge Networks • NIM/Network Analysis Center • North Hills Electronics • North Supply Co. • Northern Telecom • NOVA USA • NTT America • Nu Data • NYNEX • Octocom Systems • OFTI • Omnicom • Opcom • Optelecom • Optical Cable Corp. • Optical Data Systems • OSware • OST • PA Consulting Group • Pacific Bell • Panduit Corp. • Patton Electronics Co. • PC Week • Pentril Datacom • Phoenix Microsystems • PictureTel Corp. • Pirelli Cable Corp. • Plantronics Futurecoms • Posttechnisches Zentralamt • Processing Telecom Technologies • Progressive Computing • Proteon • Pulsecom Div./Hubbell • Racal Interlan • Racal-Milgo • Rad Data Communications • Random Corp. • Raycom Systems • Reliance Comm-Tec • Ramex Products Corp. • Ramex Corp. • Rent-A-Computer • Retix • Rockwell International • Sargent Fiber Optic Services • SATNET • SBE • Scientific-Atlanta • Scitac Communication Systems • Seisecor Technologies • Sel-Tronics • Semitron Cricklade • Service News • Shure Teleconferencing Systems • Siecor Corp. • Sierra/LSI Jennings • Soft-Com • Sokunet • South Hills Electronics • Southwestern Bell Telephone • Space Communication Systems • Spectragraphics • Spider Systems • SRA Telecom • SSE Technologies • STAR-TEK • Stonehouse & Co. • Stratacom • Superior TeleTec • Suttle Apparatus • CSI Technologies • Sync Research • SynOptics Communications • Tau-Tron • T-Bar, a Data Switch Corp. Co. • Technology Transfer Institute • Teletec • Tektronix • Telco Research Corp. • Telco Systems NAC Corp. • Telcor Systems Corp. • Teletel Corp. • Teletype Technology • Telecom Analysis Systems • Telecom Publishing Group • Telecomm-USA • Telecommunications Magazine • Telecommunications Techniques Corp. • Tele-Computer Systems • Teleconnect • Telect • Teledyne Kinetics • Teletel • Tele-Measurements • TeleMonitor Corp. • Teles • Telephone Engineer & Management • Telephony • Telitabs • Telitrend • TelWatch • The Wireworld Co. • JM Co.-Datacom Products Project • Tigon, The Voice Messaging Network • Timeplex • Touch Communications • Touchbase Systems • Transport Communications • Tricomm Services Corp. • Trompeter Electronics • TRW Information Networks • TSB International • Ultra Network Technologies • Unidata Corp. • Universal Data Systems • Universal Fiber Optics • U.S. Robotics • U.S. Sprint Limited Partnership • U.S. WEST • Valcom • VANCE Systems • Veriflex Corp. • Versa-Lite Systems • Versatron • Vertex Computer Cable & Products • VIR • Vitalink Communications Corp. • Walker Facsimile Systems • Wendel & Gottemann • Washington International Teleport • Wellfleet Communications • Westinghouse Communications Software • Williams Telecommunications Group • Wittronix • Wyle Laboratories-Electronic Enclosures • XTEND Communications Corp. • Xylogics • Xypex • Zenith Electronics Corp.

(As of 11/15/89)

The next decade may be the most exciting and fast-moving yet in the world of communications. And there's no better place to see the future before it unfolds than the exhibit halls at

Communication Networks '90, the premiere communications conference and exposition that's taking networking into the 90's.

Almost all of the leading communications suppliers will be there — more than 350 of them — with their latest products and services. You'll get a chance to see ISDN in action with our own multi-booth CN '90 ISDN network demonstration at the Ramada Renaissance/Techworld adjacent to the Convention Center. And you'll also see the latest in every key communications technology — from satellite communications, to WANs, LANs, fiber optics, network management, and PBX's.

Complete Conference Program

If you want detailed information from leading communications experts, CN '90 also offers a complete conference program. There are 15 all-day, in-depth tutorials and over 80 conference

sessions covering all the key communication topics, and designed for every level of expertise. For complete conference details, call Conference Sales at 800-225-4698 or 508-879-6700.



**COMMUNICATION
NETWORKS**
CONFERENCE & EXPOSITION

TAKING NETWORKING INTO THE 90's

**Washington, D.C. Convention Center &
the Ramada Renaissance/Techworld**

February 6-8, 1990

Communication Networks is produced by IDG Conference Management Group, an International Data Group Company, 111 Speen St., Framingham, MA 01701.



**COMMUNICATION NETWORKS '90
EXPOSITION TICKET**
TAKING NETWORKING INTO THE '90s

**Washington, D.C. Convention Center
900 Ninth Street, Washington, D.C.**

**The Ramada Renaissance/Techworld
999 Ninth Street, Washington, D.C.**

February 6-8, 1990

ADMIT ONE FREE

(A \$20 Value) Good for admission to exposition only (no one under 18 years of age admitted)

COME EARLY AND SEE EVERYTHING

Exposition Hours: Tuesday, Feb. 6, 10:00 am to 5:30 pm
Wednesday, Feb. 7, 10:00 am to 5:30 pm
Thursday, Feb. 8, 10:00 am to 4:00 pm

Registration Hours: Sunday, Feb. 4, 3:00 to 5:30 pm
Monday, Feb. 5, 7:30 am to 5:30 pm
Tuesday-Wednesday, Feb. 6-7, 6:30 am to 5:30 pm
Thursday, Feb. 8, 6:30 am to 4:00 pm

F 7

Our New TCP/IP Terminal Server: More Performance. Less Money.



In just over one year, Emulex has shipped more than 7,000 terminal servers to DEC users worldwide. Now, the number one third-party vendor in the DEC marketplace brings the same advanced product technology to TCP/IP environments.

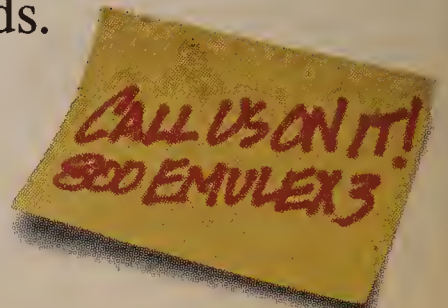
Our new Performance 4000-T Terminal Server is the optimum solution for

UNIX users who insist on high performance. Fully TCP/IP compatible, the Performance 4000-T gives you a substantially lower cost-per-port, and one of the highest throughput rates available. It also gives you a high-speed parallel printer port.

And it's built for growth. A 16-line expansion module lets you expand the 12 and

16-line base models to 28 or 32 ports. Run 16 lines at 38.4 Kbps, or all 32 lines at 19.2 Kbps. *Simultaneously.*

The Performance 4000-T provides all the TCP/IP features you expect, in a surprisingly compact package! For more information, call Emulex toll free. It's one call to one company to handle multiple product needs.



Emulex Corporation, 3545 Harbor Blvd., Costa Mesa, CA 92626, (800) EMULEX-3 or (714) 662-5600 in California

North American Offices: Anaheim, CA (714) 385-1685; Dublin, CA (415) 829-1170; Roswell, GA (404) 587-3610; Burlington, MA (617) 229-8880; St. Louis, MO (314) 569-7792; Saddle Brook, NJ (201) 368-9400; Reston, VA (703) 264-0670; Schaumburg, IL (312) 605-0888; Canada (416) 673-1211

International Offices: Wokingham (44) 734-772929; Munich (49) 89-3608020; North Sydney (61) 2-957-1669; Paris (33) 134-65-9191

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

“For nine million people, E-mail has become a fundamental part of the way they live their lives. At the beginning of the [1980s], people had no idea they’d now have this personal computer on their desk or be given a laptop when they go out selling widgets.”

Michael Cavanagh
Executive director
Electronic Mail Association
Arlington, Va.

Data Packets

Stratus Computer, Inc. last week announced a \$1.9 million contract to supply Yamaichi Securities Co., Inc., Japan’s fourth-largest brokerage, with three Stratus XA 2000 Continuous Processing Systems. The fault-tolerant computers have already been installed as part of an on-line futures and trading network.

The Stratus computers distribute prices in real time for futures and options listed on the Tokyo Stock Exchange. The computers are connected to Sun Microsystems, Inc. workstations attached to an Ethernet on Yamaichi’s trading floor and to workstations at branch offices throughout Japan via an X.25 net.

Avanti Communications Corp. recently announced that it has hired New York investment banker Needham & Co. to help secure a corporate partner. Establishing a strategic relationship with another company is the last item to be completed as part of a restructuring program the T-1 multiplexer maker announced last year. The first four were: management and personnel restructuring; an audit of the existing customer base; raising \$2.5 million in investment capital; and streamlining sales and marketing. ■

Bank raises ATM uptime without major net overhaul

Membership in ATM net forces bank improvements.

By Jim Brown
Senior Editor

LIVONIA, Mich. — Manufacturers National Bank of Detroit recently improved its ATM uptime without having to revamp its existing leased-line network that links 150 branches to its data center here.

The bank, which previously boasted automated teller machine uptime of up to 98%, was forced to improve the uptime further when it joined Magic Line, a Michigan-based multibank ATM network.

Magic Line, Inc., which operates the network, requires participating banks’ ATM nets to be up at least 99% of the time. Banks that don’t comply with the requirements face possible fines.

To boost its ATM network uptime, Manufacturers National Bank decided to off-load ATM processing from its IBM 3090 mainframe to an IBM System 88 on-line transaction processor, which is manufactured by Stratus Computer, Inc.

Since its installation last October, the fault-tolerant System 88 has kept the bank’s ATM network up 99.9% of the time, said Ken Schaeffler, vice-president and manager of the bank’s systems support department.

Bringing the System 88 into the picture also forced Manufacturers National Bank to reexamine its network of 16 multidrop leased lines that carry IBM Systems Network Architecture traffic at 4.8K bit/sec from remote ATMs, teller terminals and IBM Personal Computers emulating 3270 terminals to the data center.

The bank had to decide whether it should create a second network supporting ATMs only or look for a device that could intercept ATM traffic on the existing network and route it to the System 88. “We didn’t want to reengineer our network or create a new network that would support just ATMs,” Schaeffler said.

Redesigning the network would have meant pulling ATMs off existing circuits and dropping them onto new multidrop leased lines operating at 2,400 bit/sec. This approach would have added about \$7,000 a month in leased-line costs and forced net operators to keep their eyes on two networks, Schaeffler said.

Instead, the bank opted to install nine Netlink, Inc. SNA-Hubs in the data center. Each SNA-Hub concentrates data from two 4.8K bit/sec leased lines onto two 9.6K (continued on page 16)

AGS software lets traders access data from one PC

By Paul Desmond
Senior Writer

NEW YORK — AGS Information Services, Inc. recently unveiled Unix-based application software that enables traders in financial institutions to access multiple data sources from a single workstation.

AGS’ new software, dubbed The Platform, supports links to multiple data sources, such as Reuters Holdings, PLC, Telerate, Inc. or Dow Jones & Co., Inc. It lets users customize screens to glean only the information they need from those sources.

The software eliminates the need for traders to swivel among several different terminals, each dedicated to accessing a particular service.

In addition, The Platform includes application programming interfaces that let users extract data from external sources, such as stock quotes, then plug that data into a program, such as a spreadsheet, running on their lo-

cal workstation.

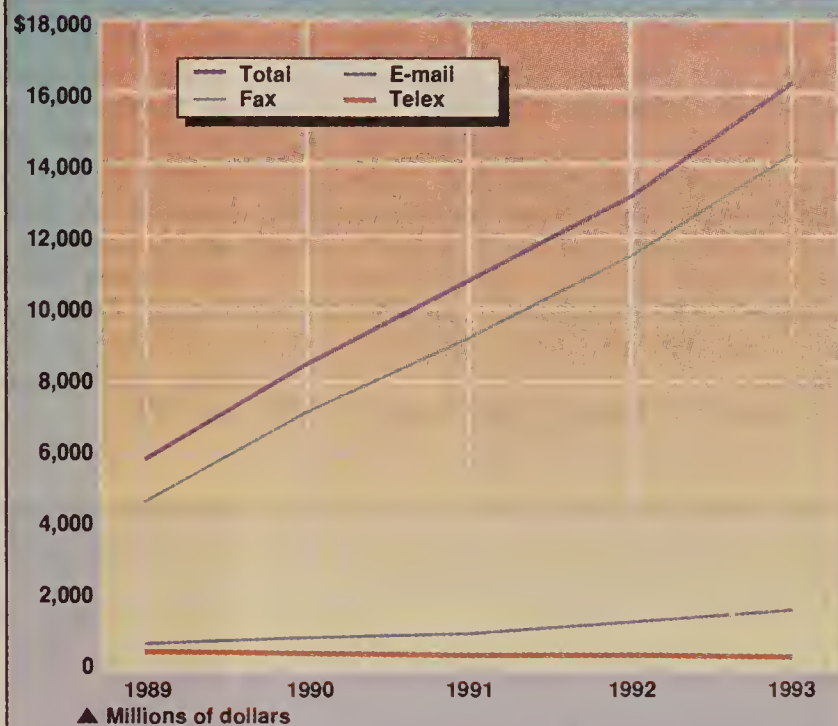
The Platform, which was co-developed with Data Logic, Ltd. of Harrow, England, runs on Unix-based processors and consists of four major software components: Applications Management, Market Data Management, Message Management and Distribution, and System Management and Administration.

Workstation support

All four components can run on the same processor or they can be distributed to run on multiple processors, said Kimberly Melvin, director of financial workstation sales for AGS. In either case, the software supports multiple trader workstations — typically Intel Corp. 80386-based personal computers running Unix — on a Transmission Control Protocol/Internet Protocol-based Ethernet network.

The first component, Applications Management, supports The (continued on page 16)

Fax, E-mail use outpacing telex



Development of standards supporting facsimile and E-mail messaging is slowing the growth of telex messaging services. Figures based on sale of equipment, software and services.

GRAPHIC BY SUSAN SLATER

SOURCE: BUSINESS COMMUNICATIONS CO., INC., NORWALK, CONN.

T-1 ties data center to bank's private net

National Westminster connects N.J. branches onto private microwave network via T-1 circuits.

By Jim Brown
Senior Editor

HUNTINGTON, N.Y. — National Westminster Bank USA recently extended its private T-1 data network so it can use public network facilities to merge the operations of two recently acquired New Jersey banks into its private microwave network.

The bank expanded its Avanti Communications Corp. Open Network Exchange (ONX) T-1 multiplexer network to link teller terminals, administrative terminals and automated teller machines in about 120 branches in New Jersey to its data center here. This will enable the bank to eliminate mainframe-based data processing operations from a South Plainfield, N.J., data center that it acquired along with the New Jersey banks.

A staunch proponent of private networking, National Westminster has a seven-node ONX network that links 40 branches in Manhattan to a 5.2-mile-long fiber cable. That fiber cable is linked to the microwave network, which broadcasts data to the company’s data center here.

Together, the fiber link and microwave facility connect about 140 branches across Manhattan and Long Island to the data center.

Bank officials wanted to extend that private network to the New Jersey data center but “we

couldn’t get a clear line of sight to the areas that needed microwave and we found it was so costly to lay fiber to the branches that we couldn’t get any major payback,” said Brian Siegel, vice-president of data communications.

Instead, National Westminster opted to use public T-1 circuits to link the sites to a nearby Jersey City, N.J., location that is tied into the company’s private microwave network.

Cutting the fat

National Westminster acquired the New Jersey branches last year when it bought The First

“We found it was so costly to lay fiber that we couldn’t get any major payback.”

▲▲▲

Jersey National Bank and Ultra Bancorporation, both of New Jersey.

“We are one of the major New York banks that are on a regional expansion binge,” Siegel said.

After acquiring the two New Jersey banks, National Westminster (continued on page 16)

Bank raises uptime without net overhaul

continued from page 15

bit/sec lines, one of which routes teller terminal and administrative traffic to a 3090-attached IBM 3725 front-end processor, while the other routes ATM transactions to the System 88 via an RS-232 cable. Previously, each of the bank's 16 leased lines were connected directly to the 3725.

The SNA-Hub also runs software that polls each of the devices attached to the multidrop leased lines. This off-loads some of the processing chores of the 3725 to the SNA-Hub, which appears to the front-end processor as a PU Type 2 device, such as a cluster controller supporting multiple logical units.

In addition to routing traffic between

two different computers, the SNA-Hub has prolonged the life of Manufacturers National Bank's 3725 by freeing up 10 of its ports and off-loading polling chores. "We were faced with either going to an expansion unit or going to a 3745," Schaeffler said.

Manufacturers National Bank may be able to free up even more 3725 ports when a new version of SNA-Hub comes out later this year. The current version of SNA-Hub supports 150 active terminal sessions, which is about 50 sessions below what Netlink originally thought each SNA-Hub would be able to support, Schaeffler said.

A new version will enable Manufacturers National Bank to use an SNA-Hub to support as many as three 4.8K bit/sec leased lines, thus freeing up another three 3725 ports. **■**

AGS software lets traders access data

continued from page 15

Platform's X/Windows-based windowing function and supplies data as necessary to any local applications running on the user's workstation, Melvin said. It also lets the workstation emulate various terminals, such as an IBM 3270 and Digital Equipment Corp. VT-100 or VT-200, to support links to financial data sources.

Message Management and Distribution is The Platform's distributed data base management system that handles data requests, Melvin said.

Market Data Manager polls the various data service providers for the data requested by users and stores it in a cache until the Message Management and Distribution

component requests it. Message Management and Distribution then forwards it to the user's workstation. Any updates to the data are automatically sent to the Market Data Manager's cache and later to the user's workstation, she said.

System Management

The last component, System Management and Administration, tracks errors and maintains user profiles that detail which data sources each trader needs and what data is required from those sources. That feature can help to keep costs down since most information providers charge according to how many users are accessing the data source, Melvin said. Managers can use System Management and Administration to ensure users have access only to the data sources they need.

The software also makes it easy for users to change location since a trader can log on from any workstation and access the same user profile.

The System Management and Administration component runs on an IBM RT Personal Computer under AIX, IBM's version of Unix.

The other components can run on any processor that runs versions of Unix currently supported by The Platform. Those versions are: AIX, DEC's Ultrix, and Unix versions from Sun Microsystems, Inc., Sony Corp. and Unisys Corp. AGS can port its software to any other version of Unix in four to six weeks, Melvin said.

The Platform is available now. Its cost varies according to configuration, but Melvin said it ranges from \$7,000 to \$10,000 per trader workstation. **■**

T-1 ties data center to bank's private net

continued from page 15

ster decided to move data processing functions from South Plainfield to here in an attempt to trim operational costs. The decision caused National Westminster to move existing applications from its South Plainfield data center, which supported New Jersey branches, and move them onto the mainframes in Huntington.

Going public with T-1

National Westminster recently completed the installation of four new ONX nodes that will be used to link IBM 3725 front-end processors remaining in the South Plainfield data center to its microwave network. National Westminster will link each New Jersey branch to the 3725s via 9.6K bit/sec analog leased lines.

Those 3725s will be linked via a channel extender to an ONX located at the South Plainfield data center.

The data center's ONX will in turn be linked over T-1 facilities provided by New Jersey Bell Telephone Co. and AT&T to another ONX at the Jersey City site, which will forward the data over the private microwave hookup to the Huntington data center.

Using the channel extender enables the bank to link the remote front-end processors, which support a top wide-area link speed of 256K bit/sec, to an IBM 3090 mainframe here at 768K bit/sec.

Additionally, an IBM 3800 laser printer and an IBM tape drive in the South Plainfield data center will be linked via another channel extender operating at 768K bit/sec to a second ONX, which in turn is linked to a 3090 in the Huntington data center via the public T-1 and private microwave nets. **■**

BUILD YOUR TOKEN-RING NETWORK WITH ANDREW

The Andrew Token-Ring System is a complete system for interconnection of PCs, minicomputers and mainframes.

Founded in 1937, Andrew brings a tradition of excellence in design and service to the world of communications.

Call for our free Token-Ring Planning Guide. The guide explains the purpose of each component of the ring and shows how they work together. We'll help you select the proper components to build your network.

Andrew Token-Ring products are fully compatible with the IBM Token-Ring Network and include:

- ☐ Token-Ring Adapter Cards
—Connect your PC to the Network!
- ☐ Multistation Access Units (MAUs)
- ☐ Token-Ring Repeaters—For extended distance capability.
- ☐ Source-routing Token-Ring Bridges

Andrew...for reduced installation costs and uncomplicated solutions for all your network needs. Call us!

ANDREW

Torrance, California
(213) 320-7126

**CALL 1-800-733-0331 ext. 3101
for your FREE Token-Ring Planning Guide**

See the FAXNet Form on Page # 39

See Us At Network World In Boston 2/13-15/90

Andrew products are available worldwide. Call for a distributor in your area, in the UK 0734-894689, in Canada 800-267-1821. IBM is a registered trademark of International Business Machines Corporation. © 1989 Andrew Corporation.

Just three years ago,
Compaq fired
the shot heard
around the world.



Now for the

In September 1986, Compaq introduced a personal computer that changed people's ideas about what a PC could do.

The COMPAQ DESKPRO 386 Personal Computer was the first PC based on the powerful 386 microprocessor. It gave people the speed and power to do more than ever before. It pushed out the envelope of technology. But did it in a way that let users continue to work with industry-standard software and hardware. With it, Compaq set a new standard in PC performance.

Compaq has done it again.

Introducing the COMPAQ DESKPRO 486/25 Personal Computer and COMPAQ SYSTEMPRO Personal Computer System.

Once again, Compaq has expanded the role of the PC—to meet the most demanding needs of both single and multiple users. And once again, Compaq has pushed out the envelope of technology to deliver new levels of performance and expandability, without sacrificing compatibility.



sonic boom.

These new computers were designed from a simple observation: People use computers differently. One user using a PC has different needs than a group working together on a network or multiuser system.

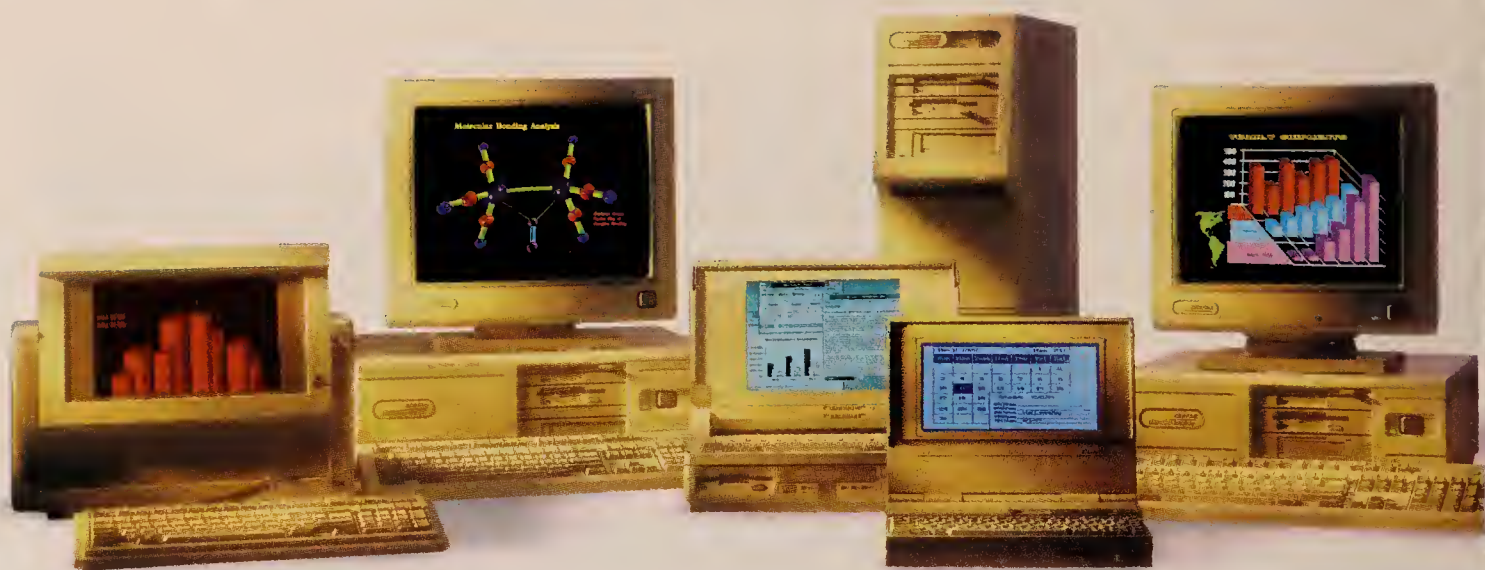
The COMPAQ DESKPRO 486/25 is for the individual whose job depends on a PC. It was designed from the ground up to unleash the power of the evolutionary new Intel 25-MHz 486 microprocessor.

The COMPAQ SYSTEMPRO delivers an unprecedented combination of system performance and expandability to networks and multiuser systems. Its breakthrough design gives users the flexibility to work with both 33-MHz 386 and future 33-MHz 486 technology. It also provides the unmatched capability to work with multiple processors.

Inside both you'll find advances like cache memory designs that boost processor performance. Extended Industry Standard Architecture (*Extended ISA* or *EISA*) that accelerates input/output performance while maintaining compatibility. New drive and controller technology that increases fixed disk performance and reliability. And that's just the beginning of this story.



When it comes to performance we believe actions speak louder than words.



Since we introduced our first personal computer in 1983, no other computer company has delivered PCs with the technical excellence of COMPAQ PCs.

Today Compaq offers a full line of high-performance personal computers. Desktops based on 286, 386 and now 486 processor technology. Portables and laptops. And our new PC system, customized for multiple users.

In every COMPAQ personal computer you'll find innovative technology. Along with plenty of common sense. Like the ability to run the world's largest library of industry-standard software. And the room to add the peripherals your job demands.

This combination of technical leadership and practical thinking is why COMPAQ PCs consistently earn the highest marks for quality from computer experts. And unsurpassed marks for satisfaction from users.

Standing behind every COMPAQ PC is a worldwide network of Authorized COMPAQ Computer Dealers. Your dealer is trained to help you build powerful computing solutions. For the location of your nearest dealer and free information, call 1-800-231-0900, Operator 107. In Canada, 1-800-263-5868, Operator 107.

COMPAQ

It simply works better.

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

"The LAN industry will continue to experience explosive growth in the 1990s. Worldwide revenue for U.S.-based LAN vendors was \$6.5 billion in 1989, and we're expecting that to double to \$12.9 billion by 1992."

Brad Baldwin
Local-area network analyst
Dataquest, Inc.
San Jose, Calif.

Software to help users manage files

By Susan Breidenbach
West Coast Bureau Chief

OREM, Utah — SoftSolutions, Inc., an 11-year-old company that develops document management software for minicomputers, recently released a product that helps administrators and users manage files scattered across a local-area network.

PerfectSolution 1.0 can be used to manage documents produced by various programs, including word processors, spreadsheets, data bases and graphics applications. It lets users build document profiles according to such parameters as the author of the document, the application in which the document was created, the date it was created and the user who last retrieved it.

The text of documents can also be indexed, so full-text searches can be done across all the hard disks on a network. The full-text indexing supports ASCII text and documents created in WordPerfect Corp.'s WordPerfect 5.0 or above. WordPerfect 5.X documents do not have to be saved in ASCII text to be indexed by PerfectSolution.

"Some packages do document management well and some have

glitzy screens, but this is a total solution for document management, data base management and spreadsheet management," said Jay Blaustein, a New York-based office automation consultant. "PerfectSolution 1.0 is the only product I know of that can do that."

The product uses a patented SpeedSearch algorithm originally developed five years ago at Brigham Young University to do rapid searches through the Mormon Church's multiple-terabyte genealogy data. According to SoftSolutions, it takes only seconds for PerfectSolution to search through thousands of documents and locate a desired file.

The product is object-oriented, automatically associating a document with its application and booting the application so that the document can be accessed. "If you are told to retrieve a document and do something with it, you don't have to know where it is or what application it was created in," said Alvin Tedjamulia, vice-president of technology for SoftSolutions.

PerfectSolution automatically tracks certain information about files, such as author, document number, directory, document type, creation date and date of last revision. Users can also create custom fields to track additional information about documents. Also, the new software permits document names of up to 70 characters, instead of the DOS
(continued on page 18)

LAN execs foretell trends of the '90s

Forecasters predict the decade will usher in a bevy of multinational nets, FDDI and WANs.

The infant local-area network industry of the early 1980s reached adolescence by the decade's end. Although more mature, the industry is still growing fast, and users and vendors are still experimenting with new technologies.

As a follow-up to last week's article in which key executives



L.J. Sevin

were asked to reflect on the 1980s ("LAN industry execs reflect on the '80s," *NW*, Dec. 25/Jan. 1), *Network World* Senior Editor Laura DiDio asked industry players to offer their opinions and predictions about the trends of the 1990s.

Patrick Courtin, president of Proteon, Inc.

"In the 1990s, data communications standards will be driven as much by politics as by technology. [Also] in the 1990s, we will have to incorporate common methods to manage and troubleshoot data communications networks into the standards right along with technical specifications. Network managers and system integrators will be faced with increasing pressures in terms of installing and repairing multinational nets.

"Consider something like the management or the simple repair of an internetwork router connecting LANs in Paris and New York.

"The French PTT has an entirely different set of installation regulations from the [International Brotherhood of Electrical Workers] union in New York. And if trouble should occur, all [that] the users know is that their transmission problems are somewhere between Paris and New York. Do you expect a French repairman to talk to a New York repairman?

"Users that want to build multinational networks spanning the globe will be faced with a daunting task. They will not only have to decide what type of network to install, but they will also have to cope with various technical standards, different network management issues, labor unions that vary according to country and myriad negotiations with various standards bodies. Most users have not yet had to cope with these issues.

"So in the 1990s, we're going to have to evolve beyond the notion of standards as just the technical concerns."

L.J. Sevin, a principal in the venture capital firm of Sevin Rosen Management and a former engineer at Texas Instruments, Inc. Sevin's firm gave seed money to Compaq Computer Corp., Lotus Development Corp. and Proteon, Inc., among others.

"One of the key developments in the 1990s is that we'll see a lot of applications integrated or built right into the network operating systems.

"As the technology matures, we'll also see the electronics in the system eventually consist of fewer and fewer monolithic chips. The need for fewer chips will signal the demise of the [network] adapter board busi-



Patrick Courtin

ness. The adapter board business as we know it, will cease to exist in the next four or five years. Adapters will be replaced by network connections built right into the motherboard of a system.

"We'll also continue to see many start-up companies in the LAN industry because the cheapest way to invest in new products is through new companies, not
(continued on page 18)

Competition sways 3Com to slash costs of bridges

By Walter Sweet
West Coast Correspondent

SANTA CLARA, Calif. — 3Com Corp. last week cut prices on its line of network bridge products by 5% to 28% in response to recent price reductions by Retix and Cisco Systems, Inc.

Industry observers view 3Com's move, which affects the price of its IB/1, IB/2000 and IB/3 bridges, as a market adjustment rather than the start of a price war.

"Based on the fact that I don't think bridges fit into the commodity mold, I don't believe this will result in a price war," said Steve Spanier, principal consultant for NeTrends, a networking marketing company in Pleasanton, Calif.

3Com said the price move reflects its effort to hold onto its share of a market that has become increasingly competitive. "3Com intends to lose no business in the internetwork bridge market, especially for remote bridges," said Les Denend, vice-president

of 3Com's Enterprise Systems Division.

In a show of one-upmanship, the company took the price reduction a step further by lowering prices on multiport bridges in addition to its single-port bridges. According to 3Com, its competitors had only cut prices on one-port bridges.

"The drive to lower prices seems to come from those companies that are more vertical in their product offering," Spanier said. "The late start-up companies can introduce products more quickly at lower prices. The effects ripple down to the larger companies."

3Com cut the price of its IB/1 Ethernet-to-broadband bridge from \$10,600 to \$9,100; the IB/2000, a local Ethernet-to-Ethernet bridge, from \$5,250 to \$4,995; the dual-port IB/3, an Ethernet bridge with low-speed line support, from \$10,500 to \$7,500; and the single-port IB/3, which has a single T-1 link, from \$11,500 to \$8,500. □

Netnotes

CrossComm Corp. of Marlborough, Mass., recently upgraded its line of local-area network-to-wide-area network (WAN) bridges to support fractional T-1 services offered by long-haul carriers.

The capability will enable customers to use the high-capacity, low-cost facilities to link CrossComm's Ethernet, token-ring and Starlan bridges. Customers can buy a 64K bit/sec fractional T-1 link for as little as \$430 per month, rather than \$2,000 to \$5,000 for a 56K bit/sec digital data service circuit.

The fractional services will also enable CrossComm customers to build WANs incrementally, adding 64K bit/sec channels as needed to support network growth. The fractional T-1 support is available at no additional charge to existing and new CrossComm bridge users.

For more information, contact CrossComm at 133 E. Main Street, P.O. Box 699, Marlborough, Mass. 01752; (508) 481-4060.

Da Vinci Systems Corp. of Raleigh, N.C., recently announced a version of its Da Vinci eMAIL product with several enhancements, including a new "MicroTSR" (Terminate-and-Stay-Resident) stub that lets the electronic mail software stay resident in 10K bytes of DOS memory. This will enable users to send
(continued on page 18)

Execs foretell trends of '90s

continued from page 17
through established firms.

Bill Carrico, president of Network Computing Devices, Inc. and former president of Bridge Communications, Inc. Carrico also served briefly as president of 3Com Corp. after 3Com acquired Bridge.

"In the 1990s, there's no question that Ethernet will run out of gas at some point. But it won't disappear entirely. Pockets of Ethernets will continue to exist, and these nets will be interconnected to 100M bit/sec Fiber Distributed Data Interface backbones. In the long term, Ethernet will be a component in the large corporatewide hierarchical net.

"The 1990s will also see the true emergence of FDDI for broad application and usage. While a few vendors have recently begun to experiment with very high-speed 1G bit/sec networks, they will remain too expensive for broad applications in the short term; they won't be widely used for at least 10 years.

"And although it's been widely reported that token-ring technology will displace Ethernet, the only place I believe IBM's Token-

in favor of another. Low-end proprietary LANs like AT&T's Starlan 1 will give way to Starlan 10 or Ethernet. The 2.55M bit/sec Arcnet may be supplanted by its successor, the 20M bit/sec Arcnet Plus.

"However, it will be a tough battle for the new 20M bit/sec Arcnet Plus product. It is definitely swimming upstream against a rip tide that includes the IEEE 802.5 16M bit/sec token ring. But Arcnet Plus may make it. One thing that continues to surprise me is the incredible customer and reseller channel loyalty toward Arcnet that has enabled it to survive in the face of stiff competition from Ethernet and token-ring standards.

"I think the wide-area networking market will continue to experience explosive growth. And certain segments within the LAN industry are going to get even hotter in the '90s. PC LANs — which include network operating system software, file servers, the network interface cards and the wiring distribution components such as multiport repeaters and intelligent wiring concentrators — will continue to grow as users install larger, more sophisticated networks.

"I also predict that 85% of all Macintoshes in the business, government and education environments will be connected by LANs by 1993.

"In the 1990s, the [telephone company] central office LANs could emerge as a strong wide-area network alternative to bridges and routers. Central office LANs could become a very useful LAN interconnect product. Using their local central telephone office equipment, users could see a convenient, cost-effective way of interconnecting their remote offices that obviates the need to hire someone to manage the WAN links.

"Bell Atlantic [Corp.] and [Pacific Telesis Group] are just two of the companies that have already begun to address the [central office] LAN market. It's a simplified way of interconnecting various offices: The phone company takes care of all the lines and linkage; it's owned and operated by the phone company. That has pluses and minuses, but for certain users, such as businesses with lots of small offices where the cost and management of an internetworking router would be prohibitive, CO LANs could be a real boon.

"And we're still not convinced that OS/2 LAN Manager will bury Novell, Inc.'s NetWare. According to our research, NetWare shipments will continue to outpace LAN Manager shipments as far [in the future as] 1993. Much depends on how much Microsoft [Corp.] and third-party developers fine-tune LAN Manager. Unix based network operating systems [such as Portable NetWare, VINES and LAN Manager/X] will also be successful." ■

Software helps to manage files

continued from page 17

limit of 11.

Searches can be delineated by Boolean operators (AND, OR and NOT), parentheses and single- or multiple-character DOS wild cards. Users can do a search employing any information in the document profile or the text of the document.

The product includes features for automatically archiving or deleting old files from the network. The network administrator can set different limits for the amount of time various types of documents are kept on-line after the last time they are accessed.

An echoing feature can be used to set up a measure of fault tolerance by automatically copying a file to a second location, such as a local hard disk or another file server. The time that a document remains unaccessed at an echo location before it is automatically removed can be different from the amount of time it is allowed to stay in the primary location.

A Report Writer facility can be

used to generate a variety of reports that can be saved in delineated ASCII format for importing into spreadsheets or other applications. An integrated billing system can track billable time spent working on documents and provide invoices based on an hourly charge set by the user or a stan-

or change the parameters for archiving and deleting documents.

PerfectSolution is compatible with any network operating system that supports the DOS SHARE.EXE (record locking) facility. Tedjamulia said SoftSolutions plans to offer network-specific versions that exploit the distributed client/server architecture of the new generation of network operating systems, such

The product includes features for automatically archiving or deleting old files from the network.

▲▲▲

dard charge established for various document types.

Security features let the network administrator assign access rights at both the screen and document level. The administrator can define which users or groups get to view, add, change or delete document profiles, perform searches, generate reports

as Novell, Inc.'s NetWare 386 and Microsoft Corp.'s LAN Manager.

PerfectSolution 1.0 is priced at \$2,495 per server, plus \$295 per workstation. If a network has 15 or more users, it is recommended that a personal computer with at least an Intel Corp. 80286 processor be used as a dedicated indexer. ■

Netnotes

continued from page 17

and receive E-mail from within other applications.

Da Vinci eMAIL V 1.6 is available in a kit that includes both DOS and Microsoft Corp.'s Microsoft Windows, as well as a new OS/2 release that will run in an OS/2 Presentation Manager window.

The kit is priced at \$1,495. Users that have purchased Da Vinci eMAIL within the last three months are eligible for a free upgrade, and other registered users can obtain an upgrade for \$100.

Other enhancements include a new manual to help users install Message Handling Service (MHS), a store-and-forward mechanism in Novell, Inc.'s NetWare network operating system that enables Da Vinci eMAIL and any other MHS-compatible application to exchange files.

"MHS is so flexible that many of our customers were getting confused about what options they should use," said Chris Evans, vice-president of marketing for Da Vinci Systems. "We developed this manual to lead people through these decisions."

The latest version also features several new add-on utilities, such as a telephone notepad receptionists can use to forward telephone messages to users, and an "in/out board" for keeping track of members of a work group. The utility disk is not enclosed in the Da Vinci eMAIL package but is available to registered users upon request free of charge.

Mountain Computer, Inc. of Campbell, Calif., said it will release two new high-capacity tape-backup systems, including its first

Digital Audio Tape (DAT) unit, early this year.

The DAT FileSafe 1200 provides 1.3G bytes of storage on a 4mm cassette.

Mountain said the product is the first in a series of planned DAT devices that will serve as the company's primary platform for future tape subsystems.

For users who want to stick with tape-backup systems supporting the widely used ¼-inch tape cartridges, Mountain also announced the FileSafe 7500. This unit provides 525M bytes of storage capacity on a single ¼-inch cartridge and is available in a dual-drive configuration that can back up more than 1G byte of data.

Prices for the single-drive FileSafe 1200 and FileSafe 7500 configurations are \$5,995 and \$3,995, respectively. They support the leading network operating systems, including Novell, Inc.'s NetWare, 3Com Corp.'s 3+ and 3+ Open LAN Manager, and IBM's PC LAN Program and LAN Server.

Silicon Graphics, Inc. of Mountain View, Calif., and **Protocol Engines, Inc.** of Santa Barbara, Calif., have entered into a \$5.5 million joint-development agreement that calls for the implementation of Protocol Engines' Xpress Transfer Protocol (XTP) in a very large-scale integration chip.

XTP is a LAN transport protocol intended for use with 100M bit/sec Fiber Distributed Data Interface (FDDI) — and even higher speed networks in the future. It is designed to deliver real-time response.

According to Protocol Engines, software-based protocols are able to use only 10% to 20%

of the bandwidth of FDDI while the XTP chip will be able to exploit close to the full 100M bit/sec speed of the fiber-optic LAN technology. This capability will open the door for real-time distributed applications, the company said.

Proteon, Inc. will install a 100M bit/sec Fiber Distributed Data Interface (FDDI) backbone network at the University of Singapore in early 1990.

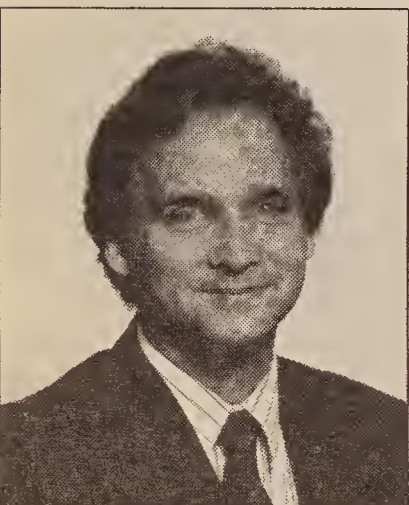
The campuswide FDDI net, which might be one of the largest in the world when it is complete, will support 13 Proteon p4200 Multi-Protocol Routers to support multiple Ethernet sub-networks. The networks will support more than 2,000 nodes, a figure that is expected to grow to well over 4,000, according to Thio Hoe Tong, president of the university.

Tiara Computer Systems, Inc. recently unveiled an eight-bit Ethernet microcomputer interface based on Fujitsu, Ltd.'s EtherStar local-area network controller chip. The adapter, called the LanCard/E * STAR8, is designed for IBM Personal Computer XT's.

The product conforms to IEEE 802.3 and Ethernet specifications and features an on-board thick and thin Ethernet transceiver and 8K bytes of buffer memory. An on-board Boot programmable read-only memory socket enables net administrators to boot workstations remotely.

The LanCard/E * STAR8 and the STAR8 is available now for \$349.

For more information, contact Tiara Computer Systems at 2700 Garcia Ave., Mountain View, Calif. 94043; (415) 965-1700. ■



Brad Baldwin

Ring Nets are being used is in the "True Blue" IBM shops and not in multivendor environments, although IBM claims they're selling all they can build."

Brad Baldwin, local-area network analyst at Dataquest, Inc.

"The LAN user of the '80s was somewhat tentative — getting the technology and still struggling with the issues of how to connect PCs, hosts and terminals, and how to manage their nets.

"Now in the 1990s, users have fully embraced the technology. The industry and its users are now teenagers — they're wild, scrambling and flirting with a certain measure of maturity. The 1990s will see bigger LANs within individual buildings, wide-area campuses and a lot more sophisticated network management as all the pieces are made available.

"In the 1990s, we'll see movements toward certain technologies, but they will be orderly transitions rather than abrupt abandonment of one technology

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Dialogue

Do you think companies can gain an advantage by farming out network functions?

“The concept is paved with potholes. Companies that outsource information systems or networking functions lose all their in-house expertise. This makes them very vulnerable if the outside vendor does a poor job.”

David Forejt

Associate vice-president
Computing and
telecommunications
University of Pittsburgh
Pittsburgh

“Outsourcing an operational function might save some money, but companies can save a lot more if they are truly committed to cutting costs.”

“Vendors have a vested interest in seeing your communications infrastructure increase rather than decrease. Also, companies will still need to keep a group of network managers around just to supervise the vendors, and that costs money. The only thing that might make sense to outsource is software development. Companies can save lots of money by developing it offshore.”

Gerard Higgins

Senior vice-president
Data processing and
communications
Drexel Burnham Lambert, Inc.
New York

“There is no general answer to the question of outsourcing. We continuously review our cost structure and requirements to determine whether outsourcing makes sense. In some cases it does — when vendors can provide better quality or lower cost services than we could. Often, however, we find it's cheaper to do it ourselves.”

Scott Abbey

Managing director of operations
Morgan Stanley Group, Inc.
New York

“Outsourcing might be a little cheaper, but it doesn't provide the same quality service as an in-house staff. Vendors will be more focused on controlling costs and making money instead of trying to meet user needs. Outsourcing might make sense for large companies, but for small and midsize shops like ours, it isn't effective.”

Burton Torrens

Director of MIS
Mount Clemens
General Hospital
Mount Clemens, Mich.

Global EDI standard short on American user support

U.S. users insist on backing ANSI X12 standard.

By Walter Sweet
West Coast Correspondent

MOUNTAIN VIEW, Calif. — A recent survey of North American electronic data interchange users indicates that while companies on this continent endorse the concept of an international EDI standard, they see little immediate need for one.

Conducted by Input, a market research firm based here, the survey was designed to examine the

impact of the EDI for Administration, Commerce and Transport (EDIFACT) standard on North American EDI users.

Input analysts concluded that the depth and breadth of EDI use must increase and there must be closer alignment between EDIFACT and the existing ANSI X12 standards before companies will support EDIFACT.

“North American users generally do not give adoption of EDIFACT a high priority, primarily because their major trading partners are not requiring it,” Input said. Consequently, users support existing X12 standards.

Users are reluctant to adopt a standard not yet being used by other companies, according to Torrey Byles, a consultant with Input.

Looking toward 1992

The survey was commissioned by the Electronic Data Interchange Association to gauge whether there will be wide acceptance of EDIFACT, a United Nations-sponsored specification. EDIFACT grew out of a push by European EDI users for a single

(continued on page 20)

EDIFACT in North America

Key findings in a survey of 100 North American EDI users:

- 1 Most EDI users agree on the need for a single, global EDI standard.
- 2 One-third of EDI users have little knowledge of EDI for Administration, Commerce and Transport.
- 3 Companies have yet to implement EDIFACT for use with international trading partners.
- 4 The main impediment to EDIFACT use is the lack of EDIFACT message sets.

SOURCE: INPUT, MOUNTAIN VALLEY, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

EXECUTIVE BRIEFS

BY WAYNE ECKERSON

EDI and small businesses. The growing use of EDI by large corporations and the federal government could spell trouble for small businesses.

That was the message of Rep. Esteban Torres (D-Calif.) who was a keynote speaker at the Electronic Data Interchange Association's 21st national conference and exhibition last month in Washington, D.C.

Large corporations and government agencies need to take steps to accommodate small trading partners that may not have the money or expertise to implement EDI, Torres said. Otherwise, the ability of the U.S.'s 19 million small businesses to compete for new business could be endangered — a problem that could have a serious impact on the nation's economy, he said.

Torres, who is chairman of the Environment and Labor Subcommittee of the House Small Business Committee, said he plans to hold hearings next summer to examine ways to improve the readiness of small businesses to implement EDI.

One proposal that will be considered is a tax credit for small businesses that implement EDI. The subcommittee will also look at ways to amend the U.S. Commercial Code to accommodate and promote the use of EDI by U.S. businesses of all sizes.

Torres said he was pleased that the Computer-Aided Acquisition and Logistics Support (CALS) program, which calls for the Department of Defense and contractors to exchange all documents electronically, has formed a small business subcommittee (“Dept. of Defense lays out standards for contractors,” *NW*, Dec. 25/Jan. 2). This subcommittee will conduct outreach programs to ensure that small businesses are not left out of the CALS program. ■

Profile of a CIO

The typical chief information officer:

- Is a 48-year-old white male.
- Earns \$162,000 a year in salary and bonus.
- Oversees an IS budget of \$122 million.
- Has worked 12 years at his present company.
- Has the title of vice-president, senior vice-president or chief information officer.
- Believes his primary job is to align IS with business strategy.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: HEIDRICK AND STRUGGLES, INC., CHICAGO

IS execs caught up in web of job pressures

Surveys show information executives are battling to combine their technology and business goals.

By Wayne Eckerson
Senior Writer

Top information executives say their primary responsibility is to integrate information technology with business objectives — but many aren't handling that responsibility very well.

That's the message of two recent surveys that show most top information systems (IS) executives are finding the job of aligning business and technology strategies more difficult than anticipated and one that requires a tremendous amount of leadership ability. Many are under great pressure to produce positive results, having assumed the positions of executives who either resigned or were dismissed.

On a positive note, top information executives are gaining more influence in determining high-level corporate strategy. Most are now an integral part of the senior executive team, rather than a lower level department supervisor. Many also now sport senior executive titles, such as chief information officer (CIO) or senior vice-president, and receive higher levels of cash compensation, according to the surveys (see chart, this page).

“It's clear that systems managers who understand their organization's business objectives and can lead fellow managers in selecting and using information technologies are emerging as a key part of today's executive management team,” said Ronald Gerevas, president and chief executive officer of Heidrick and Struggles, Inc.

Heidrick and Struggles, an international executive placement firm based here, recently completed a study of CIOs in Fortune 1,000 companies.

The study was based on interviews with 300 CIOs from the largest industrial and nonindustrial

companies in the U.S.

According to the study, the most pressing issues facing CIOs involve using technology to meet business objectives defined by senior management. Almost 70% of the CIOs surveyed said integrating corporate and information system goals are a critical part of their job.

Other critical issues cited by CIOs include: educating senior executives about the role and potential of information systems (64%); using information systems to gain a competitive edge (63%); and strategic planning

Information executives are gaining more influence in determining corporate strategy.

▲▲▲

for information systems (57%).

In contrast, few CIOs said resolving technological problems or supervising staff are critical aspects of their job.

Less than half said it is important to develop an information architecture, and less than one-third said recruiting and training IS staff, updating obsolete systems, integrating systems or cutting costs are critical aspects of their jobs.

Work still to be done

Despite the focus on merging information systems and corporate strategies, most top IS executives haven't been very successful at doing that, according to a survey of CIOs and CEOs commissioned by United Research Com-

(continued on page 20)

Int'l standard short on American support

continued from page 19

standard, in anticipation of the open market in 1992.

While EDIFACT is being promoted as a worldwide standard, it has yet to be universally embraced by veteran EDI users. "It's gotten some resistance from groups in the U.S. and the U.K.," Byles said. "There's some concern that they'd be reinventing the wheel."

Users are reluctant to adopt EDIFACT when they think the current X12 standard already meets their needs. For EDIFACT to spread, users need to be convinced that sometime in the future, they might do business with another company using EDIFACT, Byles said. If they adopt the standard now, they will be one step ahead when

this opportunity arises.

In addition, EDIFACT can gain support in the U.S. if international standards bodies weave ANSI EDI standards into the emerging EDIFACT definition, he added.

Byles said getting users to adopt the EDIFACT standard will be a long, slow process, much like businesses adopting EDI at their workplace. He said widespread acceptance of EDIFACT will occur as the result of a trickle-down phenomenon.

The first users of EDIFACT are typically Fortune 500 companies. Although these are large companies, they have many small companies for their suppliers, Byles said. If these smaller companies want to do business with the larger concerns, they have to

adopt the EDIFACT standard.

"It's going slowly," he said. "I think it's just going to be gradually accepted. A year from now, we'll see more users for it."

Trying to get such companies to back EDIFACT now would be putting the cart before the horse, Byles said. For the standard to gain significance here, more companies will have to become EDI users, he said.

"It's like a telephone," he said. "It doesn't do you any good to have one unless there are a lot more telephones out there. The critical mass for EDI hasn't gotten there yet."

Standards work

Byles pointed out that because there are ANSI design committee members who are also on the EDIFACT standards committee,

there are bound to be some similarities between ANSI and EDIFACT built into the new standard. But this does not mean all differences will be settled immediately.

"Syntax won't be reconciled in committees," he said. "Nobody knows how that will be resolved. It's going to take some hammering out."

Syntax standards in question include methods of compacting data, such as an address, and transmitting blank lines and mixing alphanumeric characters.

Byles said the ANSI standards still need work so it is possible the two standards can meet on a common ground.

"According to many users, [the standards] are far from being perfect," he said. "The existing standards families are undergoing a lot of evolution. Evolving toward EDIFACT is viable." ■

IS execs caught up in web of job pressures

continued from page 19

pany, Inc., a management consulting firm in Morristown, N.J., and "The Business-Week Newsletter for Information Executives." The study, which involved interviews with 200 CIOs and 100 CEOs, was conducted by Louis Harris & Associates, Inc., a market research firm in New York.

Only half of the CIOs and one-third of the CEOs in the survey said their company's information systems resources are adequately aligned with the company's business plans.

The reason? Companies don't adequately share business plans with IS managers, according to a majority of those surveyed.

Only half of the CIOs and one-third of the CEOs said their information systems are aligned with business plans.

▲▲▲

Three-fourths of the CIOs and 62% of the CEOs said top management needs to do a better job of sharing the corporate business plan with IS executives.

To succeed at that and other tasks, top information executives need strong management and leadership skills, rather than technical skills, at least according to the Heidrick and Struggles survey.

Seventy percent of those surveyed said leadership ability was a critical factor needed to succeed as a CIO. The second quality most often cited was "people skills." In contrast, only 14% of those surveyed said technical knowledge was an important factor.

Not surprisingly, a majority of CIOs surveyed said it was important to fill their positions with people who have more management than technical experience. However, three-quarters of the CIOs surveyed came up through the technical ranks. Only 20% of the CIOs surveyed were appointed from a nontechnical post.

Two-thirds of those surveyed disagreed with the statement that MIS managers are not suitable for CIO positions because of their technical background. Most CIOs evidently believe MIS managers gain sufficient management experience to function well as CIOs. ■



Telco Research
A NYNEX Company

October 31, 1989

Gary Beach
President
Network World Publishing, Inc.
375 Cochituate Road
Framingham, MA 01701

Dear Mr. Beach:

We recently placed an advertisement in your publication using the FAXNet information service. Soon after our ad appeared, leads started coming in - not in droves, but good leads. This contrasts with the "tire-kicking" bingo card leads we normally get which come in droves but rarely provide worthy leads.

Not only does FAXNet provide us with valuable information about prospects, the fact that someone takes the time to fill out the form and fax it to us is a good indication that they're serious about our telemanagement products and network design services.

FAXNet is a service who's time has come, and it's good to see a magazine that follows industry trends and innovations come up with innovative ideas as well.

Sincerely,

Stephen Doster
Marketing Communications Manager

1297 17th Avenue South
Nashville, Tennessee 37212
615 259-0931

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

The three most popular international value-added network service providers are Telenet Communications Corp., GE Information Services and BT Tymnet, Inc., according to a recent survey of 100 Fortune 500 network managers by Lynx Technologies, Inc. in Little Falls, N.J.

World News

Japan's 627 nondominant carriers are expected to increase investment in network facilities by 19.5% for a total investment of \$3.86 billion in fiscal 1989, which ends in March, according to figures from the Ministry of Posts and Telecommunications.

Of the two kinds of non-dominant service providers studied, Type 1 carriers are expected to increase investment in network facilities 21.3% to \$1.66 billion. Type 1 carriers build their own plant and provide service in competition with the dominant domestic carrier, Nippon Telephone and Telegraph, Ltd. (NTT), and the dominant international carrier, Kokusai Den-shin Denwa, Ltd. The rest of the expenditures will be made by Type 2 carriers, which are primarily value-added net carriers and resellers.

Deere & Co. last week announced that it has moved the uplink location from New York to Detroit for a 128K bit/sec satellite circuit connecting its central European data center in Mannheim, West Germany, with its main data center at headquarters in Moline, Ill.

William Coopman, Deere & Co.'s manager of telecommunications, said his company made the move to curtail service problems, which have plagued the terrestrial circuit linking the Moline data center to the New York facility. ■

Crossing the Atlantic

The cost of using public data networks for European communications.

Country	Network cost (dollars per month)*			
	Domestic	Intra-European	To the U.S.	From the U.S.**
Belgium	\$218	\$1,034	\$2,725	\$5,400
France	311	1,375	3,085	5,400
The Netherlands	439	1,075	2,875	4,460
Switzerland	317	1,134	2,831	5,400
United Kingdom (British Telecom International, Inc.)	226	1,400	3,499	5,400
West Germany	527	1,144	2,292	4,460

*Calculations assume approximately 25M to 35M bytes of traffic per month, sent over two communications sessions per day and lasting a total of six hours. There are 20 days of usage per month.

**Calculations assume either Tymnet or Telenet as carrier.

SOURCE: LYNX TECHNOLOGIES, INC., LITTLE FALLS, N.J.
GRAPHIC BY SUSAN J. CHAMPENY



Int'l PDNs costly for U.S. firms, study says

Companies may do better to reevaluate nets, install dedicated circuits to cross the Atlantic.

By Barton Crockett
Senior Editor

LITTLE FALLS, N.J. — For most midsize American companies, relying exclusively on public data networks to communicate with Europe is more than twice as expensive as using a dedicated circuit to carry traffic across the Atlantic.

So concludes Lynx Technologies, Inc., a consulting and systems integration firm, based here, in its newly published study "The Economics of International Public Data Networks."

In the study, Martin Morell, senior consultant at Lynx, analyzes the cost of sending approximately 25M to 35M bytes of data per month between the U.S. and six Western European countries.

He concludes that users that rely exclusively on the packet-switching services of public data network carriers can expect to pay about \$48,000 per month vs. just \$21,000 per month for a dedicated 64K bit/sec circuit to interconnect with European X.25 service providers.

Morell said the level of network activity he analyzed corresponds to the amount of traffic an average midsize company with operations in Europe would have. He said the findings indicate that companies spending anywhere from \$40,000 to \$100,000 per month to carry data traffic between the U.S. and Europe would be best served by using a dedicated link for at least the transatlantic portion of the network.

He added that users spending more than this will likely find it cost-effective to run all their traffic over a private network.

"The significant thing is that

most people use public data networks for all of their traffic," Morell said. "My results indicate that users doing this should probably go back and reevaluate what they're doing."

Improving economics

In the study, Morell calculated the cost of sending data from the U.S. to Europe via X.25 packet-switching services from BT Tymnet, Inc. and Telenet Communications Corp., the cost of sending data from each of six national European public data networks to the U.S., and the cost of using each of these six networks for intra-European and domestic communications. Calculations were made assuming a total of 7,200 minutes per month of connection time (see chart, this page).

Morell compared these expenses with the cost of running a dedicated, 64K bit/sec circuit to Europe and using a typical European public data network — in this case, The Netherlands' public data network — to communicate with other European public data networks.

Morell said that while hybrid or all-private U.S.-to-Europe networks have been the cheapest alternative for years for most users, the savings associated with these options have increased dramatically as the cost of dedicated transatlantic circuits has plummeted. He said that over the past five years, the cost of a dedicated transatlantic circuit has dropped from around \$20,000 per month to between \$6,000 and \$9,000 per month today.

Morell acknowledged that his study did not take into account the extra equipment and person-

(continued on page 22)

European stock exchanges to build shared network

PIPE net will link major exchanges on continent.

By Barton Crockett
Senior Editor

BRUSSELS — More than a dozen of Europe's largest stock exchanges are teaming up to build a network expected to pave the way for greater unity among European financial markets.

Scheduled for public availability by the end of this year, the so-called Price and Information Project for Europe (PIPE) network will distribute price quotes, news and other information from major exchanges in the 12 Common Market countries to traders around the world. Within a year or two, traders may be able to buy and sell relatively small quantities of stock over PIPE.

PIPE is considered essential for supporting the financial needs of corporations in the emerging European Common Market. As trade barriers fall, it is believed that multinational corporations will need a unified, pan-European market for buying and selling stock, which PIPE will facilitate.

"An integrated European mechanism for raising capital and trading equities will be essential to the expansion of business in 1992," said Malcolm Duncan, international relations officer for the Milan Stock Exchange and a member of the project team chartered by the Federation of Stock Exchanges of the European Community (FSEEC) to design the PIPE network.

FSEEC, based here, consists of representatives from major European stock exchanges.

Satellite considered

Duncan said the network architecture for PIPE has yet to be determined, although he said that a satellite-based system is under consideration. A contract to build PIPE is scheduled to be awarded this spring, with network operations to begin by year end. Duncan declined to name any of the vendors bidding to build the net or to estimate the cost of the project, except to say that it will run

(continued on page 22)

Satellite antenna improves int'l flight communications

CAMBRIDGE, Mass. — The U.S. Air Force, Federal Aviation Administration and Department of Transportation recently completed what they say is the first test of an advanced satellite antenna technology that promises to improve communications with airplanes flying internationally.

The new satellite antenna is ¼-in. thick, measures 16- by 32-in. wide and fits the curved contour of an airplane. An Air Force plane outfitted with one of the antennas recently flew around the world and used the satellite net to exchange messages with Transportation Department officials at the agency's Transportation System Center research facility here.

Observers said the technology will help international airlines improve efficiency by making it possible to monitor transoceanic flights more closely and allowing the industry to squeeze more planes into the most desired transoceanic air routes.

In the test, which lasted for more than a week, messages were exchanged with the plane four times a minute.

Data was bounced off satellites operated by the London-based International Maritime Satellite Organization and Washing-

ton, D.C.-based Geostar Corp.

Data from the plane was forwarded from ground stations operated by Communications Satellite Corp., Geostar and the Norwegian Telecommunications Authority over terrestrial links running at 4.8K bit/sec and 2,400 bit/sec to the department's Transportation System Center. Terrestrial service was provided by network service providers Arinc, Inc., in McLean, Va., and Washington, D.C.-based Railstar Corp.

Department of Transportation officials used Apple Computer, Inc. Macintosh microcomputers, linked in an Ethernet local network to a Digital Equipment Corp. microcomputer, to process, send and receive messages and position statements. The processors ran custom-designed software.

Department officials said that, to their knowledge, this was the first time satellite communications had been used to track and send messages to a U.S. airplane on an extended international flight.

"We did this to encourage the use of this technology in this country," said Mark Dowis, chief

(continued on page 41)

Int'l PDNs costly for U.S. firms, study says

continued from page 21

nel costs of running a private network, but he suggested that these costs can be offset by using dedicated circuits to also carry voice and facsimile traffic. He warned that despite the massive cost advantage of using private dedicated circuits for at least part of a U.S.-to-Europe network, most users rely strictly on public services.

"There's an attitude in this country that says people pay more attention to domestic matters than to international concerns," he said. "A user that wouldn't think of relying on a public carrier here automatically goes the all-public route abroad."

In the study, Morell also examined the cost of using public data networks for com-

munications to Asia and Australia. Here, Morell said, the numbers were mixed, with costs varying widely by country and no clear argument rising in favor of either all-public, hybrid or private data networks.

Pacific Rim figures

Morell figured that a user relying strictly on public data networks to communicate with six major Pacific Rim countries or cities would spend about \$74,000 per month. A user running a dedicated 64K bit/sec circuit into Australia — which had costs about average for the area — and using that country's public data network to communicate with the five other networks studied, would spend about \$64,000. Yet Morell found that overall expenses vary by more than \$10,000, depending on the countries a user communicates with, and that no de-

Crossing the Pacific

The cost of using public data networks for Asian and Australian communications.

City or country	Network cost (dollars per month)*			
	Domestic	International	From the U.S.**	Other
Australia	\$838	\$3,980	\$5,400	—
Hong Kong	696	5,413	7,040	—
Japan (Nippon Telephone and Telegraph Co. or Kokusai Denshin Denwa, Ltd.)	1,125	7,205	7,040	—
Malaysia	293	4,452	7,040	3,669 (intra-Asian)
Singapore	132	4,140	7,040	—
Taiwan	Not available	7,981	7,040	—

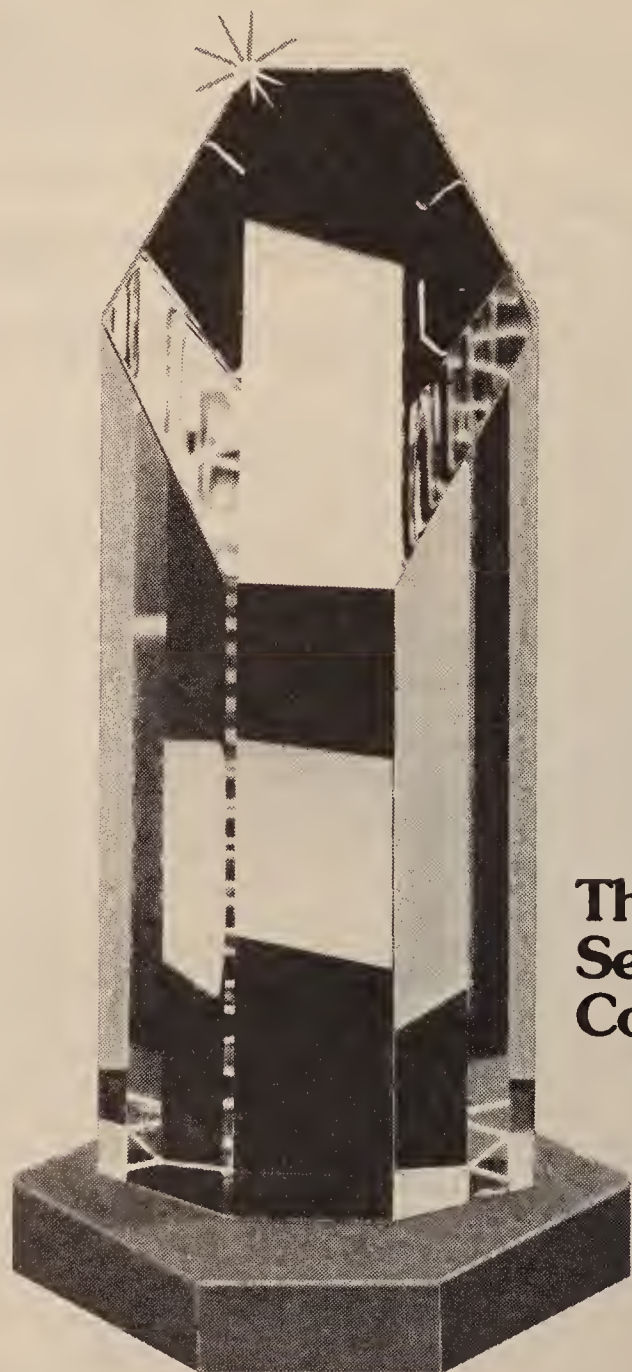
*Calculations assume approximately 25M to 35M bytes of traffic per month, sent over two communications sessions per day and lasting a total of six hours. There are 20 days of usage per month.

**Calculations assume either Tymnet or Telenet as carrier.

SOURCE: LYNX TECHNOLOGIES, INC., LITTLE FALLS, N.J.
GRAPHIC BY SUSAN J. CHAMPENY



Enterprise Networkings' Mark Of Excellence



The
Search
Continues.

THE **ENNE** AWARDS
Honoring The Best Of The Best.

Call, or write for your ENNE Award Nomination Forms today. And salute those who are defining tomorrow.

THE ENNE AWARDS PROGRAM 305 Madison Avenue, Suite 1424, New York, NY 10165 212 983-4965

NETWORK WORLD • JANUARY 8, 1990

finitive statement could be made.

The study also found that:

- European countries traditionally thought to have the lowest overall communications expenses, France and the U.K., have the most expensive public data networks, while West Germany and Switzerland, which are generally considered to have the highest network costs, have the lowest public data network charges.
- U.S. carriers Telenet and BT Tymnet charge roughly twice as much for X.25 communications to Europe as the European carriers do for X.25 service to the U.S.
- The cost of intra-European packet-switching services is fairly uniform for each of the six major European public data networks studied, while domestic rates and charges for communications to the U.S. vary significantly. ■

European exchanges to build shared net

continued from page 21

into the millions of dollars and will be funded by FSEEC members.

He explained that if the FSEEC decides to support trading over PIPE, the network will most likely execute trades in a manner similar to the New York Stock Exchange's Small Order Execution System, in which orders to buy and sell relatively small quantities of stock are routed to the exchange and automatically matched. Duncan said orders could be executed automatically by computers at the various participating exchanges or in a central PIPE data center.

Critical to the success of PIPE are efforts to establish common rules for European exchanges. Duncan said PIPE will list prices for about 300 stocks that are traded on exchanges around the world. For these prices to be reliable, he said exchanges must develop similar rules for reporting prices. He added that in order for the PIPE network to handle orders to buy and sell stocks, the participating exchanges should develop similar trade clearing and settling procedures.

The European Commission and the FSEEC are pushing exchanges to adopt similar operational rules, Duncan said. He added that the PIPE network will be vital for helping many European exchanges survive in the increasingly competitive global trading arena. As traders begin scouring world markets for the best place to trade stock, Duncan said that many will find smaller, European markets less attractive.

He explained that PIPE will help smaller European exchanges survive by making it easier for traders around the world to trade on them. ■

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Biscom ports fax front end to VINES

Biscom, Inc. recently announced a version of its facsimile front-end processor designed for Banyan Systems, Inc.'s VINES local-area network operating system.

Faxcom for VINES consists of a front-end controller, which sits between the LAN and the public network, as well as software that runs on the VINES server.

Faxcom for VINES enables end users on a VINES LAN to exchange faxes between any personal computer or workstation on the network and any Group III fax machine.

It requires VINES 3.1 or above, as well as 210K bytes of memory. The offering works with Banyan's entire line of network servers that run VINES.

The software that runs on the VINES server sells for \$800, and Biscom is offering a 25% discount on the software until March. Fax front-end controllers range from \$4,995 to \$9,995.

Faxcom for VINES is available now.

Biscom, Inc., Forest Ridge Research Park, 85 Rangeway Road, Billerica, Mass. 01821; (508) 671-5521.

Pack restricts access to Ultrix computers

Compu-Science Development Co. last week announced dial-up security software for Digital Equipment Corp.'s Unix-based servers and workstations.

The software, **Modem-Safe**, employs a dial-in, call-back technique to restrict access to systems running Ultrix, DEC's implementation of Unix. When a user calls in on a modem line, the Ultrix-based computer disconnects the call and calls back the user's preregistered phone number. The software verifies the caller's physical location, thereby preventing unauthorized access.

Modem-Safe runs on all DEC Ultrix systems. A four-modem license costs \$2,500; site licenses are available. The software will be out Feb. 7.

Compu-Science Development Co., 1634 Roll St., Santa Clara, Calif. 95050; (408) 241-4140. ☐

Harris unveils mid-range ACD supporting 384 users

Handles a maximum of 21,000 calls per hour.

By Tom Smith
New Products Editor

NOVATO, Calif. — Harris Corp.'s Digital Telephone Systems Division recently introduced a mid-range automatic call distributor (ACD) that supports up to 384 agent extensions.

The Magnum 384 ACD consists of a chassis that sits between a private branch exchange and Harris Digital Telephone Systems' station equipment, known as Magnum 384 agent telesets, as well as software that resides on the PBX. The chassis has interface cards for each station it supports; the ACD can support increments of 128 stations up to 384.

In the maximum 384-station configuration, the ACD can handle up to 21,000 calls per hour.

Magnum 384 uses two software routines for maximum call-routing efficiency: additive queuing and intelligent queue factor. Additive queuing lets users set a maximum holding time after which incoming calls for a particular extension or group will be routed to another group of agents, said Susan Shirey, systems engineer at Harris Digital Telephone Systems. The longer calls wait, the larger the pool of available agents grows.

Intelligent queue factor is a feature designed to reduce the number of abandoned calls. If the

ratio of incoming calls per available agents exceeds a user-set threshold, intelligent queue invokes additive queuing so calls can be distributed to another agent group.

Magnum 384 software, which runs on virtually any vendor's PBX, permits the user to have up to 32 incoming phone numbers for functions such as customer service and reservations.

Each agent group can serve up to eight call splits, which specify the order in which groups will receive calls coming into one number. For example, one split might designate agent Group A as first to receive customer service calls, with Group B second. Another split could designate Group B first and Group A second for receiving sales-related calls.

Magnum 384 produces reports on the activities of specific agents and groups of agents. These reports provide information such as number of calls answered, average length of calls and percentage of time idle, Shirey said.

Magnum 384 is priced from \$1,800 to \$3,600 per agent, depending on configuration. It is available now.

Harris Digital Telephone Systems can be reached in writing at P.O. Box 1188, Novato, Calif. 94948, or by calling (415) 382-5000. ☐

Valucom software prices nat'l, int'l private lines

VIENNA, Va. — Valucom, Inc. will introduce at February's Communication Networks '90 conference in Washington, D.C. a software package that enables users to price inter- and intracountry private lines.

The software, which has not yet been named, allows users to determine pricing of national and international circuits for voice-grade leased lines, digital data services and high-capacity digital services such as T-1. It runs on an IBM Personal Computer running DOS and includes rates for AT&T, US Sprint Communications Co. and MCI Communications Corp. services in the U.S., Canada, Europe and the Pacific Rim.

Users select from specific categories when trying to determine rates. The categories are U.S., which provides pricing information within the country; Canada, which gives pricing within that country; and worldwide, for

prices between countries.

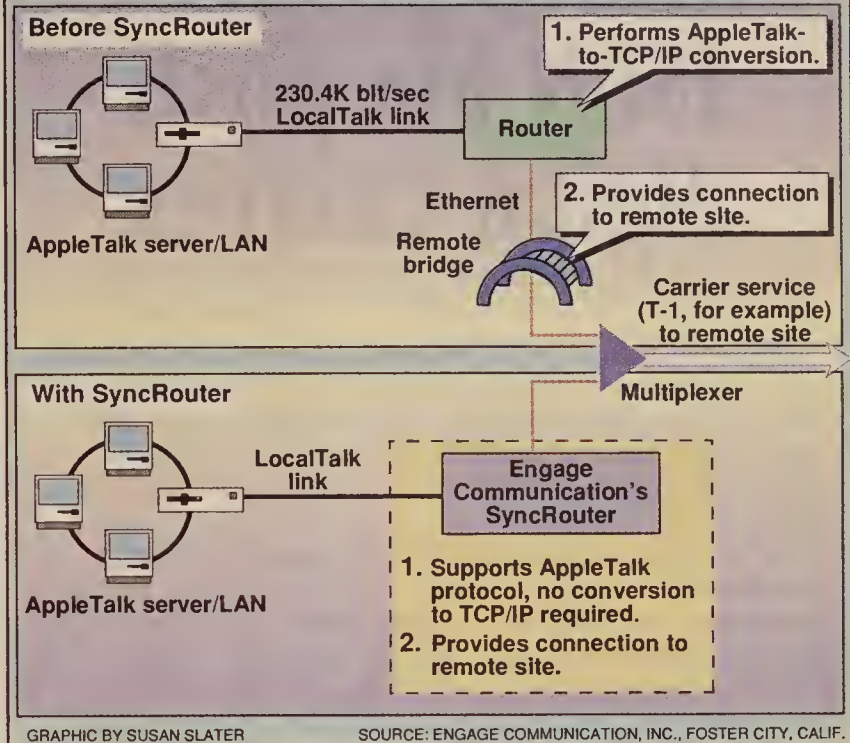
For example, customers could use the U.S. category to ascertain the nonrecurring charges of a T-1 circuit running from New York to Los Angeles using the latest tariffs filed by each carrier.

Versions of the software vary by the level of pricing detail included. A high-end version, for example, would provide end-to-end pricing between a European and a U.S. city, including local, interstate and international charges. A low-end version would provide inter- and intracountry pricing between the U.S. and Canada.

Prices for the software vary from \$5,500 to \$16,000. Software maintenance charges for regular updates range from \$4,000 to \$11,000.

Valucom can be reached in writing at 501 Church St. NE, Vienna, Va. 22180, or by calling (703) 255-0700. ☐

Tale of two router methods



Router links Apple LANs at high speeds

Engage product performs bridging and routing to eliminate need for hybrid WAN configurations.

By Tom Smith
New Products Editor

FOSTER CITY, Calif. — Engage Communication, Inc. recently unveiled a router that connects Apple Computer, Inc. AppleTalk local-area networks over high-speed synchronous communications lines.

The product, SyncRouter, integrates the functions of a router and a bridge into a single unit capable of transporting AppleTalk data across high-speed digital services. By contrast, hybrid router and bridge configurations require users to reformat AppleTalk data to support the Transmission Control Protocol/Internet Protocol.

SyncRouter supports AppleTalk protocols, connecting Apple nets to digital services that include: T-1; digital data services at 56K bit/sec and, optionally, 64K bit/sec; and very small aperture terminal satellite links.

Previously, Ethernet bridges that supported the AppleTalk protocols could only connect to public data services at speeds up to 19.2K bit/sec.

To connect to higher speed services, users were forced to pair a bridge with a router. The router then converted AppleTalk data to TCP/IP format, enabling bridges that didn't support the AppleTalk protocol to transport the data.

One early user of SyncRouter, General Electric Co.'s Corporate Information Technology organization in Bridgeport, Conn., cited a savings of approximately \$30,000 per remote site connection. The Corporate Information

Technology organization provides computer and communications services to GE operating units.

According to Tom Mack, manager of LAN operations and support services at GE Corporate Information Technology, the router has performed "flawlessly" in three of four links but has demonstrated a "tendency to fail" in the fourth link, one end of which involves numerous third-party hardware and software products.

The SyncRouter, which is based on an Intel Corp. 8088 microprocessor, can directly connect a single AppleTalk network to digital lines through one of its three standard interfaces: V.35, RS-449 and RS-232. The device's high-speed data handling capability is achieved through use of direct memory access (DMA), which off-loads data from the router's CPU.

An application bundled with the router, SyncView, can be used to configure the local router. SyncView also displays the router's operational status, local and remote network numbers, status of its communications line and the line's level of utilization and bit rate.

SyncRouter can also provide interconnection to networks running EtherTalk and TokenTalk, which are Apple protocols corresponding to Ethernet and IBM Token-Ring LANs, respectively. In such a net, the user would also require a router between the AppleTalk and Ethernet or token-ring

(continued on page 41)

OPINIONS

ISDN

BY ROBERT STEARNS

RBHCs promise ISDN but push digital Centrex

The regional Bell holding companies have placed artificial barriers on Integrated Services Digital Network availability, further delaying the implementation of a technology, which many already think is too little, too late. This deliberate manipulation does a disservice to both users and equipment manufacturers.

For several years, the RBHCs have promoted Centrex as a cost-effective alternative to private branch exchanges for voice applications. But users who consider Centrex too expensive and are wary of forfeiting control of their corporate network to the telephone company have generally stayed with their PBXs. Private networks combining PBXs and data communications equipment offer users what Centrex offers and more.

The advent of ISDN standards and the digitization of the public network have provided a new platform for the RBHCs to continue their Centrex sales pitch. It is easy to understand why the RBHCs have been staunch supporters and promoters of ISDN: They are eager for new service opportunities.

What is less clear is why some RBHCs are not offering ISDN access without the Centrex packaging. They are actually promoting *ISDN* and selling *Centrex*. Is it because they truly believe that voice applications are what customers want from ISDN, and, more importantly, are willing to pay for? This is unlikely, as most large corporations that are typically early adopters of new technologies already own PBXs, and surveys have shown that users are seeking data applications that will benefit from or be supported by ISDN. Or is it that the RBHCs are more comfortable selling voice services and, in their haste to capture the corporate network, have chosen a shortsighted approach to ISDN applications?

The ever-expanding network

The corporate network has become a strategic resource for organizations of all sizes. Use of the public switched network for wide-area data communications is expected to grow by 30% over the next five years. ISDN Basic Rate Interface provided by the local telephone companies could play a major role in providing high-quality transmission to stimulate this transition.

Users should not underestimate the potential to add value to some data networking applications that require leased lines today. Network availability and the ability to migrate to new technologies for data applications is critical to most users. But since these applications do not require Centrex services, the RBHCs have virtually ignored them. In fact, service offerings and network interface specifications are designed to support Centrex.

Users will suffer if certain RBHCs continue to block ISDN availability to vendors unwilling to buy packages of 250 or more digital Centrex lines. This will delay research and development, manufacturing and, ultimately, delivery of a variety of ISDN-compatible products to the user community at reasonable prices. Without a choice of products, many users won't purchase ISDN services.

The promise of ISDN is to bring standardization, simplification and cost reduction to today's networks that depend upon both private and public network services. It is ironic that the very organizations that stand to realize significant increases in revenue are hindering ISDN deployment.

The RBHCs are fighting hard to regain revenue lost to private networks and bypass. But it is a battle they will most likely lose if they don't address the sophisticated voice and data requirements of corporate users. Independent network equipment vendors that lack a vested interest in promoting Centrex features will better provide customers with cost-effective ISDN voice/data networking strategies. ■

Stearns is vice-president of corporate marketing at Codex Corp. in Canton, Mass.

NETWORK WORLD

The Newsweekly of User Networking Strategies

Editor
John Gallant
Executive Editor
John Dix
Assistant Managing Editor — News
Charles Bruno
Senior Editors
Industry Update — Bob Brown
Data Communications — Jim Brown
International Networking — Barton Crockett
Local Networking — Laura DiDio
Telecommunications — Bob Wallace
Senior Writer
Paul Desmond
Management Strategies — Wayne Eckerson
New Products Editor
Tom Smith
Assistant to the Editor
Cheryl Tynan

Network World
161 Worcester Road
Framingham, Mass. 01701
(508) 875-6400
MCI Mail — 390-4868

An IDG Communications Publication

Assistant Managing Editor — Production
Beth Khoury
Associate Editor
Joanne Cummings
Copy Editors
Liz Pappas
Michelle Beaulieu
Karen Maierhofer
West Coast Bureau
501 Second Street, Suite 600
San Francisco, Calif. 94107
(415) 978-3160
Bureau Chief
Susan Breidenbach
West Coast Correspondent
Walter Sweet
Washington, D.C. Bureau
650 National Press Building
529 14th Street NW
Washington, D.C. 20045
Bureau Chief
Anita Taff
(202) 347-6184
Washington Correspondent
Gail Runnoe
(202) 347-4180

Features Editor
Steve Moore
Associate Features Editor
Bruce Guptill
Features Writer
Salvatore Salamone
Assistant Features Editors
Alison Conliffe
Susan Collins
Art Director
Dianne Barrett
Informational Graphics Designer
Susan Champeny
Junior Graphic Designer
Susan Slater
Contributing Editors
Alan Pearce
John J. Hunter
Joe Mohen
Daniel Briere
President/Publisher
Gary J. Beach
Assistant to the President
Mary Fanning

EDITORIAL

New Year's resolutions for users, vendors and the press

Psychologists say the dawn of a new year is actually a bad time to make resolutions.

They contend that the emotional and physical stress of the holidays clouds thinking and leads people to make unrealistic demands on themselves. They make resolutions they probably can't keep, resulting in disappointment, guilt and frustration. This makes change even harder to achieve in the future.

Be that as it may, we humbly propose some resolutions that members of the user and vendor communities, as well as regulators and representatives of the press, may want to embrace.

Network managers should get more involved.

It's become almost trite to say that managers should get more involved in business strategy, that they should develop a greater understanding of corporate goals and problems, and try to design technological solutions that help the company achieve objectives and overcome obstacles. But it's true, and it takes work.

Initiate meetings with senior-level executives and middle managers to learn more about their concerns and their goals, and how network and computer systems can help. What works well today? Why? What's wrong or needed? Is your staff responsive to their needs? How can relations be improved?

Learn about major projects and how your group can take part. Let other executives know

that you're aware and involved.

Also, get involved — or get more involved — in a users group or in standards-setting activities. Help shape the industry; don't leave your fate in the hands of others.

Third, resolve to take time from daily operations to look at the big picture. Draft or refine a strategic plan that illustrates how networking supports major corporate efforts or provides a competitive edge. Make sure you're meeting the objectives spelled out in that plan. Look for ways to make your staff more responsive and productive.

In short, take time to manage rather than react.

For vendors, resolve to make good on your commitments to open systems and integration. Lots of companies are talking a good game here. It's time they developed and delivered the products. It's easy to make promises; now follow through.

Also, be more realistic regarding product announcements. Make it clear to users and to the press when you are announcing an actual product as opposed to outlining a strategy. Don't introduce products until they are ready to be delivered or close to it — at the very least, they have to exist and be working. If the product isn't designed, let alone built, tell people you're simply outlining your strategy. Don't make delivery promises you can't keep.

Local carriers should resolve to improve their networks, re-

spond to user needs with new services, billing and management tools, and keep pricing in line. Alternative carriers are starting to flex some muscle. If the locals don't respond, they may just lose those big business customers that once seemed to be a captive audience.

The Federal Communications Commission should resolve to answer the question of AT&T's status in the competitive long-distance market. A ruling on competition in the long-haul market is vital to a cohesive regulatory policy.

The FCC should also do everything in its power to encourage competition in the local loop. Users have benefited immensely from competition in long distance. It's time to let competition work its magic in local services.

Lest we sound holier than thou, we in the press have our work cut out for us in 1990.

We resolve not to get caught up in the hype, to explore the important issues and not be dazzled by the biggest, the fastest, the newest and the largest. We resolve, as one reader advised us, to make the connections for our readers — to go beyond the simple facts and explain why something is important to users and how it will affect their networks.

And, finally, we resolve to continue strengthening our ties to the user community. That's the only way to provide users with the information they need. ■

OPINIONS

Is AT&T still a dominant carrier?

PRO:

By GERALD KOVACH

Not too long ago, AT&T grabbed headlines with a complaint to the Federal Communications Commission protesting what it calls "asymmetric regulation." The complaint, ostensibly protesting MCI Communications Corp.'s tariff practices, is a smokescreen. It is another in a long series of attempts by the dominant firm to hoodwink regulators and the public into believing that black is white and up is down — in other words, that monopoly power is competition.

To call AT&T's claim of nondominance Orwellian does not do justice to its audacity. The claim begs a series of questions. If AT&T doesn't think its current market share constitutes dominance, what does it regard as the magic number? Is AT&T's market share loss of 1% per year over the past 20 years equivalent to full and fair competition? Exactly where does AT&T draw the line between dominance and nondominance, and when did we cross it? Was it last week, or a year ago?

It's certainly true that AT&T no longer has the more than 90% market share it held at divestiture. Thanks to increased competition, this monopoly share has been eroded and has yielded a growing number of competitors, new technologies and services, as well as an overall 40% drop in prices since 1984. The era of competition has also fueled the revenue and profit growth of MCI and newer industry competitors — as well as AT&T.

Pointing to its market losses and competitors' growth, AT&T now argues that it no longer has the power to drive competitors out of business. To successfully compete in the postdivestiture marketplace, MCI and others have built efficient technologies into large-capacity networks that now challenge the former monopoly. But it's wrong to believe there is nothing AT&T can do that would drive out smaller competitors, prevent market entry or generally frustrate competition.

Take market share, for example. Common sense would suggest that there is a world of difference between a fully competitive industry and one that is dominated by a company that controls more than 70% of the long-distance industry. AT&T's

Kovach is senior vice-president of external affairs for MCI Communications Corp. in Washington, D.C.

(continued on page 40)

CON:

By WILLIAM CATUCCI

"Dominant carrier." Even the words sound ominous. And that, of course, suits just fine those who deliberately want to conjure up images of a giant roaming the marketplace, having its way without constraint.

The Federal Communications Commission coined the phrase "dominant carrier" almost a decade ago to describe the Bell System, long before the massive changes in the structure of the nation's telecommunications industry took place. At the time, this description of the Bell System's role in the long-distance business did indeed have some basis in fact. In the early 1980s, the Bell System was virtually the only game in town when it came to long distance.

But the divestiture of the local exchange companies that controlled the bottleneck local exchange and the advent of virtually ubiquitous equal access have made the term a relic of the past. The images the term evokes are as far from reality as today's telecommunications industry is from the predivestiture Bell System.

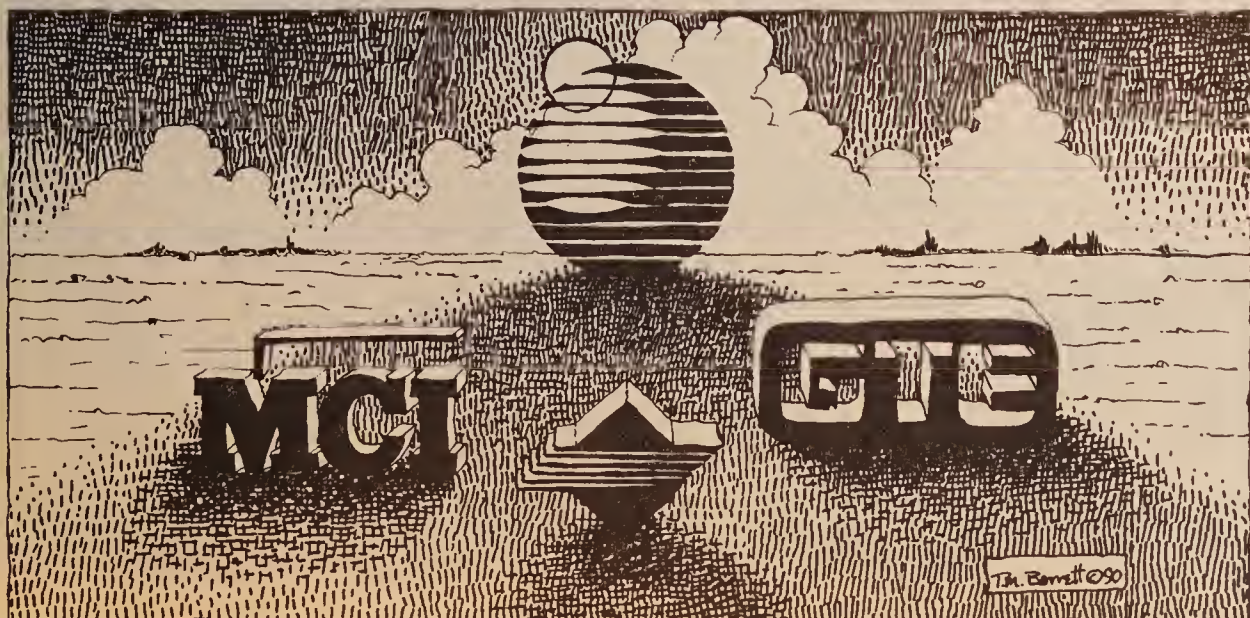
AT&T's competitors argue that AT&T is so dominant that it alone should be tightly regulated. Without regulation, they claim, AT&T would be such a powerful force that it would control the marketplace and drive out competition. But scrutiny of the facts proves these to be hollow arguments.

To be sure, AT&T is still the largest long-distance company in terms of market share. According to FCC figures, it has about 67% of the overall interstate market today, based on minutes of use.

This current 67% share of the interstate market is down from nearly 100% in the early 1980s. But even this dramatic plunge masks a much more significant loss in highly contested segments of the market. In domestic outward-bound business services, for example, AT&T's share has plunged 25% in just four years — from 77% in 1984 to about 52% in 1988, based on AT&T's market research. During the same period, while this profitable submarket has expanded 56%, AT&T's minutes have grown only 6%. By contrast, its competitors have enjoyed a growth rate of 35% in this market segment.

Catucci is vice-president of federal regulatory affairs for AT&T.

(continued on page 38)



TELETOONS

BY FRANK AND TROISE

Great Moments in Networking History

March 6, 1986

The first telecommunications rap song is recorded:

Since things got tight on the satellite..
We switched to cable overnight..
It worked out swell but suddenly..
the satellite reduced its fee..
Oh woe is me! Oh woe is me!



LETTERS

The future is here

In his informative article, "Wireless LANs go where cable fears to tread" (NW, Nov. 6, 1989), Benn Kobb speaks of the deployment in Great Britain of "a cordless pay telephone network" as a future development. However, it's already here and has been since Aug. 23. And it works; I used a test system to place calls in London this past June via Phonepoint, one of the four authorized Telepoint systems.

Telepoint is not a pay telephone system in the sense that coins must be dropped in a slot to use it; instead, all charges are added to subscribers' phone bills. Charges are only 10% to 20% higher than if the same call were placed from a pay phone.

Because of the low cost of placing calls and the compact-

ness of the cordless phones, Telepoint is expected by some carriers to compete strongly with the cellular system. Cellular enjoys even greater penetration in the U.K. than in the U.S.

Telepoint, unlike cellular, does not permit calls to be placed to subscribers. To place calls, subscribers must be within a hundred yards of the base stations that tie into the public network.

Two American telecommunications giants, Motorola, Inc. and Nynex Corp., participate in Telepoint via investment in two of the four consortia developing systems.

Mel Mandell
Free-lance writer
New York

Letters may be edited for space and clarity.

SHARE YOUR KNOWLEDGE with other telecom pros in a column for *Network World's* Opinions pages.

Manuscripts should be letter-quality, double-spaced and between 600 and 900 words. Disk or modem submissions are preferred.

If you'd like to write one, call Steve Moore, features editor, at (508) 875-6400, ext. 732, or fax your idea to us at (508) 820-3467.





Enterprise internetworking

The ties that bind

CONTINUED FROM PAGE 1

EDI at E.I. du Pont de Nemours & Co. in Wilmington, Del. "When getting started, there are two options," Foote explains. "Some companies may go to a third-party network right away. But in many cases, a dial-up capability is all that's needed."

"As the number of externally connected partners increases, people find that having dial-up capability or direct lines is not very cost-effective. At that point, you see people putting most of their business through one of the third-party networks."

There are instances where companies switch from a third-party network back to a direct link. For example, Foote says, if a company's traffic volume with a particular trading partner increases to the point where the third-party network starts to become expensive, the company may opt for a dedicated line to that one partner. This is done while maintaining the third-party net

service for all other transactions.

Another reason to go to a direct link would be if the transactions are time-critical. For example, in some just-in-time inventory-type situations, rapid response is the key. In other cases, Foote says, the issue is one of customer service, where "it is not a matter of saving a few dollars." For instance, Chrysler Corp. wants its trading partners to stay on the line while it processes the information in a message. This may require a dedicated line, according to Foote.

In some cases, there may be yet another approach to enterprise internetworking. "If the whole thing gets too big, the company may decide to run its own network," Foote says. "If the bills from the third-party networks get to the point where it would be cheaper to install store-and-forward software on its own computers, add the ex-

(continued on page 28)

More and more,
companies are linking their
own enterprisewide
networks with those of
customers, suppliers and
trading partners.

ILLUSTRATION ©1990 MANUEL KING

tra communications ports, controllers and modems, and invest the time and people to support such a network — then it may be worth the change.”

International internets vital

For many companies, linking up with trading partners requires international connections. Here again, third-party networks are commonly being used.

Companies can follow a couple of models to establish worldwide links to trading partners, according to Dave Taylor, vice-president and director of interenterprise systems at Gartner Group, Inc., a market research firm in Stamford, Conn.

“You need lines, support and applications, as well as local computers, to provide translation and

Services], IBM, AT&T or BT Tymnet [Inc.] than to start their own [network],” says Taylor.

Some have suggested trading partners might form enterprise internetworks by sharing the cost of direct or dedicated links. Shared cost approaches were tried several years ago, especially with satellite circuits to places such as Hawaii and Alaska, according to Frank Dzubeck, president of Communications Network Architects, Inc., a consulting firm in Washington, D.C.

“Corporate America doesn’t like [the shared direct-link approach] because the other party can listen to what they are doing,” Dzubeck continues.

Companies hesitate to use a dedicated net as the intermediary for multiple parties such as dis-

products to bridge the local-area environment onto the wide-area [environment] and then back to either another local area or to a workstation at another facility,” says Barry Gilbert, a principal with the COMM/SURV group of TFS, Inc., a market research firm in Westford, Mass.

“Products that do bridging, routing, gateways, multiprotocol routers and things of that nature are probably the hottest market today in internetworking connectivity.”

The enterprise internetworking we see today is analogous to the early stages of our telephone systems, according to Paul Severino, president and founder of Wellfleet in Bedford, Mass. Severino explains that a relatively small number of places are connected; a larger number aren’t. Additionally, companies are installing private networks and linking them to public networks through gateways.

Digital Equipment Corp. uses gateway technology to connect its own facilities with trading partners throughout the world. DEC has more than 200 gateway connections in Europe and one in the U.S., according to Peter Brown, strategic technologies group manager at DEC.

DEC views its international enterprise internetworking capability as a strategic advantage for developing products and providing customer service. “We are connected to multiple trading partners in both directions,” Brown says. DEC accomplishes this interconnection through gateways and the GE Information Services network.

“We use our own network to move information from various manufacturing plants to a single gateway. Then it goes over the public network and gets dropped off at the appropriate vendor’s mailbox. We have multiple manufacturing plants [that] directly order parts from vendors,” Brown says.

A unique way in which DEC has used electronic links with customers to its advantage is in the creation of an “electronic store,” which allows customers to browse.

The electronic store lets customers look through a text-only electronic catalog and place orders.

“Essentially, it’s paperless ordering,” Brown explains. “An outside purchasing agent sits at a desk in Company X and is able to look at a quote for both the price and delivery date. The agent can then launch an order, and it’s received in digital form essentially instantaneously.”

These services allow DEC to trim time from the sales and delivery cycle. Perhaps more importantly, the network helps the company reduce design time for new products.

“The [area in which] we feel very positive about our networking advantage is its ability to tie together multiple design loca-

tions with vendors. We can build various elements of a product around the world and marry them together because we are able to do so much work over the network,” Brown explains. “It allows us to exchange parametric testing data and daily yields, and to pass specifications to the vendors.”

For example, DEC’s RA90 disk drive was designed in Kaufbeuren, West Germany, Shrewsbury, Mass., and Tempe, Ariz. The drive was tested in Colorado Springs and West Germany. “If we found a problem in the Colorado facility, we were able to alert the operation in [West] Germany instantaneously,” Brown notes.

EDI boom

The U.S. EDI market is predicted to reach \$252 million in 1990, according to COMM/SURV’s Gilbert. That’s up from an estimated market of \$145 million in 1989. These figures include the transmission, time-sharing and software needed for EDI transactions. Gilbert sees this market exceeding \$1 billion per year by 1993.

These figures receive tacit support by a new report soon to be published by Input, an international planning service firm in Mountain View, Calif. The Input study, “Advanced EDI Services,” estimates that the EDI market will grow at a rate of 40% per year through 1994.

“What’s happening in interconnection this year is staggering,” says Mike Cavanagh, executive director of the Electronic Mail Association in Washington,

D.C. “The growth in the acceptance of X.400 in the past couple of years has been extraordinary.

“In addition,” he says, “the X.500 directories standard is coming into place.”

EDI and electronic mail are commonly used on enterprise internetworks, and the use of both is expected to grow. “The real story is that things are beginning to happen. There is an acceleration taking place today,” Cavanagh says.

Similar security issues

When trading partners link corporate networks, the issue of security comes up. The general question is: How do companies maintain their own security while allowing trading partners access to information?

“You get the same security problems in enterprise internetworks as with any network,” says Howard Frank, chairman of Network Management, Inc., a systems integration and facilities management firm headquartered in Fairfax, Va.

According to Frank, customer access to company networks is usually very well-defined. “You don’t let them get into just any part of your network,” he explains. “You let them get into a specific part, like your order-entry cycle. The customer links tend to be very well-controlled, whereas hostile invaders can interconnect or invade anywhere.”

Frank says that in his opinion, a network that is well-protected against hostile intruders is certainly well-protected from customers or clients. ■

Infonet’s advantage is that it gets right into the central office by selling off part of the service to the PTTs. This gives them an advantage in international EDI,” Taylor says.



mailboxing services,” Taylor says.

“You want the service to be a local call to a local machine. People do not want a node 8,000 miles away; they want local value added. The IBMs and GE Information Services of the world have done this pretty much one way [through wholly owned international subsidiaries]. And Computer Sciences Corp., through its Infonet Network Services Group, has done it another way.”

What Infonet has done is make arrangements with the overseas post, telephone and telegraph administrations in countries where it does business. “There’s obviously limited opportunity to do that,” Taylor explains. “It’s difficult.”

In many areas of the world, telephony is still highly regulated. For example, in Australia, Telecom Australia owns everything — and it has its own EDI service. In other words, they offer their own value-added service.”

“Dealing with the local phone companies has advantages in [each country in] that particular region. But the question is, how do you get outside? Infonet’s advantage is that it gets right into the central office by selling off part of the service to the PTTs. This gives them a competitive advantage in the international EDI market,” Taylor adds.

Third-party networks offer companies the advantage of getting an international interenterprise network up and running quickly. “For larger companies that want global EDI service now, it’s frankly a lot faster to get involved with a [GE Information

tributors and suppliers, he adds. To get going with EDI, companies tend to go to a third party. “This way, you have the third party act as your intermediary with respect to your EDI [transactions] with your multiple vendors,” Dzubeck says.

“The third-party EDI suppliers like [GE Information Services], AT&T, Telenet, BT Tymnet, Infonet, Cable and & Wireless [PLC], have interlinking agreements with one another. In other words, they all link their EDI service with all the other EDI services. They are interlinking their systems to create the inter-enterprise network.”

Dzubeck explains that companies are forming interconnections out of need. “They understand the necessities of it all.”

While the third-party route satisfies most enterprise internetwork requirements, in some instances, dedicated or direct lines are still needed, such as when one trading partner has to supply multipage reports.

“Suppose a company needs inventory information broken out by distributor locations and types of goods. You cannot exchange this quantity of information in an EDI transmission. You’re talking about a ream of paper,” explains Dzubeck. “To exchange this material, dedicated lines are needed.”

Gateway technology is hot

“What we are seeing now is a fairly major rise of companies like Vitalink [Communications Corp.], cisco [Systems, Inc.], Wellfleet [Communications, Inc.] and others that are providing

Formalizing the marriage

There’s more to establishing an enterprise internetwork than putting the physical connections in place. Bringing trading partners together generally starts with some type of trading partner agreement.

“When companies start doing EDI, they need to do more than buy some computer equipment [and] software and then throw a switch,” says Ben Wright, a Dallas-based attorney and author of *EDI and American Law: A Practical Guide*.

“Commonly, they put together a manual that says: ‘This is how EDI is going to be conducted between us.’ Once the partners agree on the technical matters, they must make agreements on the legal matters.

“Companies should be aware of the legal questions,” Wright says. For example, if the companies are executing contracts through EDI transactions, then the legal aspects must be included in the trading partner agreement.

There are other legal issues that need to be addressed when using EDI. “As you design the inter-enterprise system, you need to decide what methods will be used to satisfy the tax laws and other laws that require the retention of documents,” Wright explains. “For example, you may need to keep paper copies of [EDI-generated] invoices for inventory or tax purposes.”

When third-party networks are used in enterprise internetworks, additional legal matters may need to be addressed. “A third-party network usually requires signed agreements,” Wright notes. “Such agreements, which are usually prepared by the attorneys representing the third party, tend to disclaim liability of the third-party network. The least these agreements do is limit or reduce the liability of the third-party network in a case where there is a mistake.”

— Salvatore Salamone

TELECOM

BUYER'S



GUIDE

PRIVATE-LINE
SERVICES, PART II

Private-line options and enhancements

By DANIEL BRIERE

The nation's long-distance providers have been constantly seeking ways to prevent the private-line market from being sold on price alone. Unfortunately, the natural long-term trend of any product or service is toward commodities — generic products differentiated solely by price.

Voice-grade private lines are a classic example of this trend. Analog voice-grade circuits won early distinction as a means of cutting bulk point-to-point long-distance costs. As more applications were found for voice-grade private lines, extra features such as C conditioning, D conditioning and various signaling options were added to give a broader level of usage.

In recent years, all of the carri-

ers' offerings have become similar to one another, making voice-grade private lines a commodity item. As applications demanded more stringent parameters and options, carriers created digital products to handle them.

In addition, reductions in T-1 prices and the availability of fractional T-1 services are pushing voice-grade service ever faster toward the last leg of the natural product life cycle: obsolescence.

Digital data services are similarly threatened; most carriers are abandoning them in favor of T-1 and fractional T-1. AT&T, for

CHART • GUIDE

Six *Network World* Buyer's Guide charts containing information on the features of a variety of private-line options and enhancements can be found on pages 30, 32, 34, 36 and 38.

Briere is president of Tele-Choice, Inc., a Manchester, Conn., telecommunications consultancy specializing in long-distance service analysis and network design. He can be reached at (203) 645-0471.

(continued on page 30)

Two forces drive private-line options: user needs for net management and control, and carrier wishes to avoid commodity pricing.



NETWORK WORLD

T-3 options

Company	Product	Voice-grade signaling or echo cancellation	Voice-grade conditioning (C and D)	Voice-grade multipoint/drop bridging	DDS secondary channel service	DDS multipoint/drop bridging	DDS subrate multiplexing	M24 multiplexing (LEC, IXC)	M44 multiplexing (IXC)	M13 multiplexing (IXC)	CCR-DACS, DACS	Route diversity	Automatic alternate routing	Fiber-only routing	CPE provided
ATC Boca Raton, Fla. (407) 750-2961	LaserNet 45	N/A	N/A	N/A	N/A	N/A	N/A	LEC/\$450 NRC, \$450 MRC; IXC/\$450 NRC, \$450 MRC	Yes/\$800 NRC, \$800 MRC	Yes/\$800 NRC, \$800 MRC	CCR-DACS/ICB, DACS/ICB	Yes/ICB	Yes/ICB	Yes/ICB	Yes/ICB
AT&T Basking Ridge, N.J. (800) 247-1212	Accunet T45 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	No	M28 Multiplexer/\$500 NRC, \$1,000 MRC	No	No	Yes/15% of internal ordering cost (net protection-capability)	Yes/\$0	Yes/\$0
Cable & Wireless Communications, Inc. Vienna, Va. (703) 734-4534	DS3 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	Yes/ICB	Yes/ICB	No	Yes/ICB	Yes/\$0	Yes/ICB	Yes/ICB
Consolidated Network, Inc. St. Louis (314) 993-9009	DS3 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/\$1,500 MRC; IXC/\$1,500 MRC	Yes/\$1,500 MRC	Yes/\$1,500 MRC	DACS/\$900 MRC	Yes/ICB	No	Yes/city pair (rate method)-specific pricing	Yes/ICB
Digital Signal, Inc. Southfield, Mich. (313) 356-2090	DS3 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	No	Yes/\$500 per end MRC	DACS (T-1)/\$100 MRC	Yes/ICB	No	Yes/\$0	No
MCI Communications Corp. Washington, D.C. (202) 872-1600	TDS 45	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate; IXC/\$1,000 NRC, \$240 MRC	No	Yes/ICB	No	Yes/ICB	Yes/ICB	Yes/\$0	Yes/ICB
Metromedia/ITT Long Distance Secaucus, NJ (201) 330-5467	ITT DS3 Service	N/A	N/A	N/A	N/A	N/A	N/A	ICB	ICB	Yes/ICB	DACS/ICB	Yes/ICB	Yes/ICB	Yes/ICB	Yes/ICB
Mutual Signal San Francisco (415) 952-7762	DS3 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	No	Yes/\$479 MRC	No	No	No	Yes/\$0	No
Norlight Madison, Wis. (608) 833-8332	DS3 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/No	No	No	CCR-DACS/ICB, DACS/ICB	Yes/ICB	No	Yes/ICB	Yes/ICB
Telecom*USA, Inc. Atlanta (404) 250-5980	FiberLink 45	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	No	Yes/\$0	No	No	No	No	No
Transpoint Communications Los Angeles (213) 785-0660	DS3 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate; IXC/No	No	No	CCR-DACS/\$0, DACS/\$0	Yes/ICB	Yes/ICB where available	Yes/ICB	No
US Sprint Communications Co. Kansas City, Mo. (800) 877-6000	Clearline 45	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	No	Yes/ICB	No	Yes/ICB	No	Yes/\$0	Yes/ICB
Williams Telecommunications Group, Inc. Tulsa, Okla. (918) 588-3210	DS3 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	No	Yes/\$250 NRC, \$2,000 MRC	N/A	Yes/\$1,000 NRC	No	Yes/\$0	No

CCR = Customer-controlled reconfiguration
DACS = Digital access and cross-connect system
ICB = Individual case basis
LEC = Local exchange carrier
MRC = Monthly recurring charge
N/A = Not applicable
NRC = Nonrecurring charge

The information in this chart was provided by the carriers listed. Questions about chart listings should be directed to the individual carriers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

(continued from page 29)

example, is migrating users to its fractional offering, Accunet Spectrum of Digital Services (ASDS), as fast as possible.

Enhancing options

User thirst for enhanced network management is spawning a new era of customer-controlled access into carrier data bases and support facilities, providing more hands-on manipulation and testing of private network facilities.

Some of these features are carrier network-related, such as fiber-only routing and automatic alternate routing. Others are product-specific, such as line reconfiguration and digital access and cross-connect system (DACS) service.

Most of the enhancements are extensions of carriers' in-house network management. Only re-

cently have customer interfaces been developed to allow users to participate in these management services.

AT&T has the most advanced levels of private-line management. Some newer entrants to this "enhanced private-line offerings" market — most notably MCI Communications Corp. and Williams Telecommunications Group, Inc. (WTG) — have launched or are finalizing packages to compete head-to-head with AT&T.

Some of the smaller carriers, such as Norlight and ATC/Microtel, Inc., are also offering customized access on an individual case basis.

In the near future, these enhancements will segment the marketplace, leaving users with two choices for private-line services:

■ Managers can buy basic, gen-

eric private lines and provide their own multiplexing, management and testing facilities. This increases users' buying power; they can compare and purchase private lines as simple "capacity pipes."

■ Managers can buy private lines as enhanced services, recognizing that shopping for similar enhanced options might limit the number of available providers to a few sources or even a single source. This may increase expenditures, but it should provide greater network flexibility.

Net management offerings

Private-line carriers are offering many network management-style enhancements to basic service. A detailed listing of carriers and options begins on this page.

Initial offerings center on line reconfiguration, with carriers adding extra value through:

■ Network optimization — users can optimize networks with reconfiguration features through either on-demand or scheduled changes to a network's design.

■ Disaster recovery — when a point of presence (POP) or local central office crashes, reconfiguration features can provide re-routing, typically in five to 30 minutes.

■ Alternate routing — preprogrammed alternate paths may be set up for implementation on demand — whether for an emergency or as a standard need.

Other net management functions will grow from these initial offerings.

AT&T has two main service functions aimed at users of its Accunet T1.5 private-line product.

The first is Customer Controlled Reconfiguration (CCR). AT&T's CCR service functions allow users to electronically recon-

figure DS0 channels within AT&T's Accunet T1.5 circuits via a customer premises-based terminal. This basically gives users access to AT&T's DACS.

The CCR architecture is rather simple. The user connects with AT&T's Special Service Management System (SSMS) in Freehold, N.J., either through a private line or dial-up facility.

If a user dials in, AT&T's computer will dial back the user device after a security code has been entered. However, the customer must provide an 800 number for the dial-back.

Networkwide DS0 cross-connection information is stored in the SSMS data base. Each DS0 is listed as a path through the AT&T network. Users can store multiple network paths together as a map of a desired configuration. These maps may be invoked on demand

(continued on page 32)

Who Can Deliver Private Network Control With Fractional T-1 Right Now?

The networking technology of the 1990's is available right now from GDC. Which means that our customers are taking advantage today of the limitless interconnectivity and lower tariffs of Fractional T-1 (FT-1) while maintaining private network control.

We have been implementing FT-1 networks for our international customers since 1985. Based on this experience we designed FT-1 into our MEGAMUX® Transport Management System (TMS).

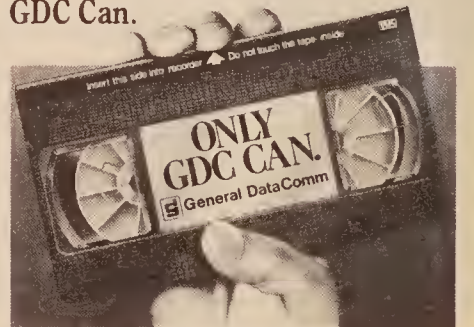
MEGAMUX TMS embeds network intelligence into each DSO. For the first time you have the flexibility to configure, reconfigure and control individual DSO's - while maintaining network management integrity. As a result, we can provide you with the highest level of FT-1 functionality and network management control. Right now!

And you don't need complex external cabling or equipment to achieve this performance. This saves you a lot of time, money and installation headaches.

To ensure that you always maintain control, GDC utilizes an exclusive centrally weighted network management architecture providing global knowledge of the network from a single point. Redundant control can also be implemented to distribute visibility and control around the network.

And because true network management goes beyond backbone architecture, we provide all the products you need to manage your network from desktop-to-desktop.

To find out more about the numerous advantages of a GDC FT-1 network, call or write for our free video. When it comes to offering FT-1 with the most functionality and control, **Only GDC Can.**



Call 1-800-777-4005, General DataComm, Middlebury, CT 06762-1299. Tel: (203) 574-1118, Telex: 643357, Fax: (203) 758-8507.

See our live ISDN demonstration at Comnet '90, Feb. 6-8, Washington Convention Center, Booth #1138; Ramada Renaissance, Booth #R-42.

ONLY GDC CAN.

 **General DataComm**

NETWORK WORLD

T-1 options

Company	Product	Voice-grade signaling or echo cancellation	Voice-grade conditioning (C and D)	Voice-grade multipoint/drop bridging	DDS secondary channel service	DDS multipoint/drop bridging	DDS subrate multiplexing	M24 multiplexing	M44 multiplexing (IXC)	M13 multiplexing (IXC)	CCR-DACS, DACS	Route diversity	Automatic alternate routing	Fiber-only routing	CPE provided
American Private Line Needham, Mass. (617) 455-9000	T-1 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/ICB, IXC/ICB	No	Yes/ICB	DACS/ICB, CCR-DACS/No	Yes/ICB	Yes/ICB	Yes/ICB	Yes/ICB
ATC Boca Raton, Fla. (407) 750-2961	LaserNet 1.544	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/\$450 NRC, \$450 MRC	Yes/\$800 NRC, \$800 MRC	Yes/\$800 NRC, \$800 MRC	CCR-DACS/ICB, DACS/\$100 MRC	Yes/ICB	Yes/ICB	Yes/\$0	Yes/ICB
AT&T Basking Ridge, N.J. (800) 247-1212	Accunet T1.5 service	N/A	N/A	N/A	N/A	N/A	N/A	IXC/\$500 NRC, \$289 MRC	Yes/\$500 NRC, \$517 MRC	No	CCR-DACS/\$285 NRC, \$387 MRC	Yes/IXC charges plus \$600 onetime per-channel charge	Yes/through CCR or bandwidth management system	Yes/\$0	No
Cable and Wireless Communications, Inc. Vienna, Va. (703) 734-4534	DS-1 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/\$850 NRC, \$312 MRC	Yes/ICB	Yes/ICB	CCR-DACS/ICB, DACS/\$500 NRC, \$250 MRC	Yes/15% sur-charge	Yes/\$0	Yes/\$0	Yes/ICB
Consolidated Network, Inc. St. Louis (314) 993-9009	DS-1	N/A	N/A	N/A	N/A	N/A	N/A	LEC/IXC, \$1,000 NRC, \$750 MRC	Yes/\$1,000 NRC, \$750 MRC	Yes/\$1,000 NRC, \$750 MRC	DACS/\$300 MRC, CCR-DACS/No	Yes/10% of MRC	No	Yes/CP-specific pricing	Yes
Digital Signal, Inc. Southfield, Mich. (313) 356-2090	DS-1	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	DACS/No, CCR-DACS/No	Yes/\$0	No	Yes/\$0	No
Metromedia-ITT Long Distance, Inc. Secaucus, N.J. (201) 330-5467	DS-1 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/\$500 NRC, \$250 MRC	Yes/ICB	Yes/ICB	DACS/ICB, CCR-DACS/No	Yes/ICB	No	Yes/ICB	Yes/ICB
MCI Communications Corp. Washington, D.C. (202) 887-3208	TDS 1.5	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/\$1,000 plus \$3 per active voice card NRC, \$240 MRC	Yes/ICB	No	CCR-DACS (MCI DRS)/\$258 NRC, \$387 MRC	Yes/ICB	No	Yes/\$0	CSU/\$100 per channel bank NRC, \$240 MRC
Mutual Signal San Francisco (415) 952-7762	DS-1 service	N/A	N/A	N/A	N/A	N/A	N/A	No	No	Yes/\$479 MRC	CCR-DACS/No, DACS/No	No	No	No	No
Norlight Madison, Wis. (608) 833-8332	DS-1 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate	No	No	CCR-DACS/ICB, DACS/ICB	Yes/ICB	No	Yes/ICB	Yes/ICB
Southwest Network Services Austin, Texas (800) 999-2864	Digital Service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate; IXC/ICB	No	No	CCR-DACS/\$0, DACS/\$0	Yes/\$0	Yes/\$0	Yes/\$0	Yes/ICB
Telecom*USA Atlanta (404) 250-5980	FiberLink 1.5	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/standard with DACS	No	Yes/standard with DACS	DACS/\$100 NRC, \$25 MRC	No	No	No	No
Transpoint Communications Los Angeles (213) 785-0660	DS-1	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/\$0	No	No	CCR-DACS/\$0, DACS/\$0	Yes/ICB	Where available	Yes/ICB	No
US Sprint Communications Co. Kansas City, Mo. (800) 877-6000	Clearline 1.5	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate	No	No	CCR-DACS/No, DACS/\$0	Yes/ICB	No	Yes/\$0	CSU/\$100 NRC, \$240 MRC; channel bank, \$100 NRC, \$525 MRC
Williams Telecommunications Group Tulsa, Okla. (918) 588-3210	DS-1 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate	No	Yes/\$250 NRC, \$2,000 MRC	DACS/\$250 NRC, \$350 MRC, CCR-DACS/No	Yes/\$750 NRC	No	Yes/\$0	No

CCR = Customer-controlled reconfiguration
CP = City pair (rate method)
DACS = Digital access and cross-connect system
DDS = Digital data services
ICB = Individual case basis

IXC = Interexchange carrier
LEC = Local exchange carrier
MRC = Monthly recurring charge
N/A = Not applicable
NRC = Nonrecurring charge

The information in this chart was provided by the carriers listed. Questions about chart listings should be directed to the individual carriers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

(continued from page 30)
or on a scheduled basis.

Superframe (D4) or extended superframe format (ESF) framing options are permitted; support is limited to the DS1 level. Further, CCR is available only with private-line services; no connections to switched services via M24 multiplexing or direct DS1 interface are available.

A second network tool for T1.5 users is the Bandwidth Management Service (BMS), which automatically reconfigures a cus-

tomers' network in less than one minute. It also allows customers to test their networks and monitor network performance.

BMS is a function of AT&T's Accunet T1.5. It uses AT&T multiplexer technology in the serving office to configure and cross-connect DS0 circuits within and between Accunet T1.5 circuits. Among the many specific capabilities of BMS are:

- Automatic alternate routing of customer cross-connected circuits between nodes.

- Reconfiguration of customer internodal networks.

- Rapid configuration and reconfiguration of Accunet T1.5 nets.

- Reporting of performance monitoring, traffic measurement, alarm information, customer-initiated testing and on-demand selective trouble reporting.

BMS customer private-line networks are routed through a series of POPs controlled by BMS Node Controllers. These controllers communicate with every oth-

er node controller in the user network through inband data links, maintaining a constant, up-to-date picture of the network.

The BMS user connects with the node controllers through a dedicated 9.6K bit/sec DDS link between the customer premises and AT&T's 3B2/400 BMS System Controller in Freehold. That system controller is then linked with the BMS Node Controllers through Network Administration Ports (NAP).

The BMS configuration func-

tions can be on a scheduled, unscheduled or automatic basis. In automatic reconfiguration, the system controller reacts to facility or equipment failure and, based on a predetermined set of instructions, reconfigures the network around that failure.

In scheduled reconfiguration, users instruct the System Controller to reconfigure the network according to a pre-planned schedule. In unscheduled reconfiguration, users in-

(continued on page 34)

Where The World Connects



NETWORLD 90 BOSTON

HYNES CONVENTION CENTER • FEBRUARY 12-15, 1990

On February 12-15, 1990, at the Hynes Convention Center, NetWorld returns to Boston for an eagerly awaited encore. For four days NetWorld--the only computer trade show universally acclaimed as "the industry standard"--will be host to a dazzling display of the best in the business. Only at NetWorld can you count on reviewing everything you need to make the right networking decisions.

The whole connectivity industry comes together at NetWorld. Hundreds of exhibitors--from Apple to Digital to Novell to Sun to IBM--are demonstrating the newest, most exciting and best networking hardware, software and services. Whether you're planning your first network or evaluating cutting-edge options and advancements, NetWorld is the best place to see and hear it all.

Get smart fast at the world-famous NetWorld seminars

- over 100 sessions in the best Seminar Series in the business
- an added day just for conferences and new full-day Tutorials
- special tracks for LAN Management, Network Planning & Design, Basic, Standards, Software & Applications and more!
- your best educational opportunity of the year!

Call today for complete seminar, registration, travel and hotel information
800-444-EXPO!

Fractional T-1 options

Company	Product	Voice-grade signaling or echo cancellation	Voice-grade conditioning (C and D)	Voice-grade multipoint/drop bridging	DDS secondary channel service	DDS multipoint/drop bridging	DDS subrate multiplexing	M24 multiplexing (LEC, IXC)	M44 multiplexing (IXC)	M13 multiplexing (IXC)	CCR-DACS, DACS	Route diversity	Automatic alternate routing	Fiber-only routing	CPE provided
American Private Line Needham, Mass. (617) 455-9000	Fractional T-1	N/A	N/A	N/A	N/A	N/A	N/A	ICB	N/A	N/A	DACS/ICB	Yes/\$0	No	Yes/\$0	Yes/ICB
ATC Boca Raton, Fla. (407) 750-2961	LaserNet 64	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/\$450 NRC, \$450 MRC	N/A	N/A	Yes/ICB	Yes/ICB	Yes/ICB	Yes/\$0	Yes/ICB
AT&T Basking Ridge, N.J. (800) 247-1212	Accunet Spectrum of Digital Services	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	No	No	No	No	Yes/\$0
Cable & Wireless Communications, Inc. Vienna, Va. (703) 734-4534	Intelli-Flex	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	CCR-DACS/ICB, DACS/\$500 NRC, \$250 MRC	Yes/15% sur-charge	Yes/\$0	Yes/\$0	Yes/ICB
Digital Signal, Inc. Southfield, Mich. (313) 356-2090	Fractional T-1	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	No	Yes/\$0	No	No	No
MCI Communications Corp. Washington, D.C. (202) 872-1600	Digital Private Line Service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/ICB	N/A	N/A	No	Yes/ICB	No	No	CSU/ICB, channel bank/\$1,000 NRC, \$400 + \$6 per active voice card MRC
Norlight Madison, Wis. (608) 833-8332	Fractional T-1 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/No	N/A	N/A	Yes/ICB	Yes/ICB	No	Yes/ICB	Yes/ICB
Southwest Network Services, Inc. Austin, Texas (800) 999-2864	Fractional T-1 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/ICB	N/A	N/A	Yes/\$0	Yes/\$0	Yes/\$0	Yes/\$0	Yes/charges equipment-dependent
Transpoint Communications Los Angeles (213) 785-0860	Fractional T-1 service	N/A	N/A	N/A	N/A	N/A	N/A	LEC/LEC rate, IXC/\$0	N/A	N/A	Yes/\$0	Yes/ICB	Yes/ICB where available	Yes/ICB	No
US Sprint Communications Co. Kansas City, Mo. (800) 877-6000	Clearline Fractional T-1	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	DACS/\$0	No	No	Yes/\$0	No
Williams Telecommunications Group, Inc. Tulsa, Okla. (918) 588-3210	Fractional T-1	N/A	N/A	N/A	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	DACS/\$250 NRC, \$350 MRC	No	No	Yes/\$0	No

CCR = Customer-controlled reconfiguration
DACS = Digital access and cross-connect system
DDS = Digital data services
ICB = Individual case basis
IXC = Interexchange carrier

LEC = Local exchange carrier
MRC = Monthly recurring charge
N/A = Not applicable
NRC = Nonrecurring charge

The information in this chart was provided by the carriers listed. Questions about chart listings should be directed to the individual carriers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

(continued from page 32)
struct the system controller through a remote terminal to reconfigure the network on an ad hoc basis.

AT&T recently added BMS-Extended (BMS-E) to BMS. This provides end-to-end control of customer-provided equipment with AT&T node controllers, including the local-access lines. BMS-E uses the Supervisory Data Link (SDL) Protocol that allows control of a network from the user's premises via SDL-compatible equipment, such as AT&T's Acculink Network Manager.

Pricing for BMS and BMS-E is considered expensive; there are nonrecurring and recurring charges for the system controller, for node controllers at each AT&T serving office on the network and for the BMS port. One BMS port is needed for each 1.544M bit/sec channel connected to a node controller.

However, to cut the impact on telecommunications budgets, AT&T offers term and discount plans that include BMS, as well as

other office functions such as route diversity and subrate data multiplexing. Under the newest plans, these optional features are discounted at the same rate as the associated intercity channels, which can mean up to 56% discounts from list prices.

The major differences between BMS and CCR are speed and depth. CCR provides reconfiguration in an average of five minutes for networks, but it can take longer. CCR users generally do not require the automatic restoration and network management capabilities of BMS. CCR is targeted to users with mainly voice-grade circuits.

BMS is attractive to Accunet T1.5 users with large and midsize networks that require advanced net management features for critical data applications that are integrated with voice-grade and video circuits.

MCI's INMS

MCI's private-line management options tie in closely with the carrier's overall network

management package, Integrated Network Management Services (INMS). MCI is molding its various systems into an integrated management approach for users with hybrid networks.

MCI's INMS includes six application groups for network management, one of which is configuration management. Two primary products constitute configuration management: Configuration Manager (previously called Information Manager or CIMS), which manages virtual network configurations, and Digital Reconfiguration Service (DRS), which controls configurations for private lines. The two services allow users to rearrange their services from premises-based terminals.

The first phase of DRS, available now, is called Fixed Network Reconfiguration, which is used for many of the same applications as AT&T's CCR service:

■ Drop-and-insert capability, which is available among the 201 cities served by MCI's TDS1.5 T-1 service. Drop-and-insert is ac-

complished at the DS0 or full T-1 level on private, leased backbone circuits.

■ Users can separate circuits for specific applications, allowing allocation of application-specific bandwidth among limited resources.

■ DRS provides a subset of smart multiplexing capabilities that a small user may not be able to afford otherwise — features such as drop-and-insert, on-demand rerouting and management reporting.

MCI plans to upgrade DRS in the third quarter of 1990 with a capability called dynamic allocation of bandwidth. This will provide management of shared facilities over fiber-optic networks at the DS0 or unframed DS1 levels.

MCI also provides another level of private-line management through its MCIVIEW gateway to IBM's NetView. MCIVIEW furnishes service and performance alarm information for MCI's TDS1.5 service; alarm information is displayed on the NetView Alerts-Dynamic screen. MCIVIEW

is an application of INMS, or Operations Management.

Other carriers ready wares

WTG is beta-testing its own network management products. The company currently offers DACS service and plans to add reconfiguration options for changes in users' network needs and disaster recovery situations. WTG is also in the process of designing and implementing an ESF performance-monitoring system for its commercial users.

A novel link now being installed by WTG is direct user access to its provisioning system and inventory management system. This will allow users to check the status of any order with the carrier and compare progress relative to agreed-upon timetables.

WTG also plans to allow users to remotely enter trouble tickets. The carrier is designing a system to alert users if WTG has already started working on a problem — even before the user reports the problem. Users will also be able to

(continued on page 36)

Mother's Day. To florists it's life in the fast lane.

optic network (using Northern Telecom DMS 250 and 300 switches)

And the driving force behind it all is information. Because

dramatically improved throughput and access to FTD's 14,000 member

sending flowers means

sending data over long

distance networks. Networks

that, because of tremendously

high traffic, cannot always pro-

cess orders in time.

Which is why

this Mother's Day,

FTD® switched their

Mercury Network® system to US Sprint®. A move of no small consequence

because the results were, to say the least, fruitful.

In fact, it proved to be the ultimate arrangement of flora and

fiber optics. Thanks to Signalling System Seven, Sprint's all digital fiber

© 1989 US Sprint Communications Company Limited Partnership. ® US Sprint is a registered trademark of US Sprint Communications Company Limited Partnership.

terminals. As a result,

FTD processed orders

more successfully than ever before.

And over two million mothers re-

ceived brightly colored bundles of joy.

We can go on but

that's really what Sprint

Account Managers are for.

So why not give yours

a call. Chances are we can bring your business into the world. That

is, to say, the new world of US Sprint.

It's a new world.™



How Sprint helped over 2,000,000 expectant mothers with their deliveries.

DATE	DESTINATION	ORDER	GREETING
May 14, 1989	Mrs. Betty Benson 779 Mills Ave Chicago, IL 60661	1 Dozen Garden Roses	Happy Mother's Day! Love, Hank
May 14, 1989	Mrs. Bette Marvin 45 Bank St Brisbane, CA 94005	Mixed Bouquet	Warmest Wishes on Mother's Day, Marc
May 14, 1989	Mrs. Marion Elder 1597 Corona Blvd Boston, MA 02134	1 Dozen Pink Roses	To the Greatest Mom Ever Maddy
May 14, 1989	Mrs. Cheri Baird 321 Park Lane NY, NY 10013	Iris Bouquet	Hugs and Kisses Love, Sheila
May 14, 1989	Mrs. R. Schumacher 14 Briana Way Denver, CO 80205	Potted Mums	Thinking of You, Mom Love, Lauren

Pgl Col 0 NL ORDERS.DOC

NETWORK WORLD

DDS options

Company	Product	Voice-grade signaling or echo cancellation	Voice-grade conditioning (C and D)	Voice-grade multipoint/drop bridging	DDS secondary channel service	DDS multipoint/drop bridging	DDS subrate multiplexing (LEC, IXC)	M24 multiplexing (LEC, IXC)	M44 multiplexing (IXC)	M13 multiplexing (IXC)	CCR-DACS, DACS	Route diversity	Automatic alternate routing	Fiber-only routing	CPE provided
American Private Line Needham, Mass. (800) 624-9203	Digital Data Service	N/A	N/A	N/A	No	No	LEC/No, IXC/No	LEC/No, IXC/No	N/A	N/A	No	Yes/\$0	Yes/\$0	Yes/\$0	Yes/ICB
AT&T Basking Ridge, N.J. (800) 247-1212	Dataphone Digital Service	N/A	N/A	N/A	Yes/LEC rate	LEC/LEC rate, IXC/\$0	IXC/LEC rate, IXC/No	LEC/No, IXC/No	N/A	N/A	No	Yes (56K bit/sec only; 2- or 3-path option)/\$204 NRC, \$106 MRC	No	No	No
Cable & Wireless Communications, Inc. Vienna, Va. (703) 734-4534	FiberPoint DDS	N/A	N/A	N/A	No	No	LEC/LEC rate, IXC/ICB	LEC/LEC rate, IXC/\$850 NRC, \$312 MRC	N/A	N/A	N/A	Yes/15% of MRC	Yes/\$0	Yes/\$0	Yes/ICB
Consolidated Network, Inc. St. Louis (314) 993-9009	DDS	N/A	N/A	N/A	Yes/LEC rate	Yes/LEC rate	LEC/No, IXC/No	LEC/No, IXC/No	N/A	N/A	DACS/\$100 MRC	Yes/10% of MRC	No	Yes/CP-specific pricing	Yes/ICB
Digital Signal, Inc. Southfield, Mich. (313) 356-2090	56K bps	N/A	N/A	N/A	Yes/LEC rate	Yes/LEC rate	LEC/\$0	LEC/No, IXC/No	N/A	N/A	No	Yes/\$0	No	No	No
Metromedia-ITT Long Distance, Inc. Secaucus, N.J. (201) 330-5467	Digital Data Service	N/A	N/A	N/A	Yes/ICB	Yes/ICB	IXC/ICB, IXC/No	IXC/ICB, IXC/No	N/A	N/A	DACS/ICB	Yes/ICB	No	Yes/ICB	Yes/ICB
MCI Communications Corp. Washington, D.C. (202) 872-1600	Digitalk Data Service	N/A	N/A	N/A	No	No	LEC/No, IXC/No	LEC/No, IXC/No	N/A	N/A	CCR-DACS (MCI DRS)/\$25 NRC, \$30 MRC	Yes/ICB	No	No	Yes/ICB
Norlight Madison, Wis. (608) 833-8332	Digital Data Service	N/A	N/A	N/A	Yes/LEC rate	Yes/LEC rate	LEC/LEC rate, IXC/No	LEC/No, IXC/No	N/A	N/A	No	Yes/ICB	No	Yes/ICB	Yes/ICB
Southwest Network Services Austin, Texas (800) 999-2864	Digital Service	N/A	N/A	N/A	Yes/LEC rate	Yes/LEC rate	LEC/No, IXC/ICB	LEC/LEC rate, IXC/ICB	N/A	N/A	CCR-DACS/\$0	Yes/\$0	Yes/\$0	Yes/\$0	Yes/ICB
Telecom*USA, Inc. Atlanta (404) 250-5980	FiberLink 56	N/A	N/A	N/A	Yes/LEC rate	Yes/\$60 NRC, \$20 MRC	IXC/\$25 MRC, IXC/No	LEC/No, IXC/No	N/A	N/A	No	No	No	Yes/where available	Yes/where available
Transpoint Communications Los Angeles (213) 785-0660	56K bps	N/A	N/A	N/A	No	No	LEC/No, IXC/No	LEC/LEC rate, IXC/ICB	N/A	N/A	CCR-DACS/ICB, DACS/ICB	Yes/ICB	Yes/ICB	Yes/ICB	No
US Sprint Communications Co. Kansas City, Mo. (800) 877-6000	Clearline Digital Data Service	N/A	N/A	N/A	No	Yes/\$10 NRC, \$12 MRC (all drops beyond first two)	LEC/No, IXC/No	LEC/No, IXC/No	N/A	N/A	DACS/\$0	No	No	Yes/\$0	DSU/\$100 NRC, \$100 MRC
Williams Telecommunications Group, Inc. Tulsa, Okla. (918) 588-3210	DS0 (DDS)	N/A	N/A	N/A	No	Yes/LEC rate	LEC/No, IXC/No	LEC/LEC rate, IXC/No	N/A	N/A	DACS/\$250 NRC, \$350 MRC	No	No	Yes/\$0	No

CCR = Customer-controlled reconfiguration
 CP = City pair (rate method)
 DACS = Digital access and cross-connect system
 DDS = Digital data services
 DSU = Data service unit
 ICB = Individual case basis

IXC = Interexchange carrier
 LEC = Local exchange carrier
 MRC = Monthly recurring charge
 N/A = Not applicable
 NRC = Nonrecurring charge

The information in this chart was provided by the carriers listed. Questions about chart listings should be directed to the individual carriers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

(continued from page 34)
 review, on-line, the trouble ticket history of their circuits.

Cable & Wireless Communications, Inc. plans to launch a series of network management functions this year, including CCR. Functions will correspond closely with existing offerings from other vendors in the marketplace, including standard reporting and graphical interfaces. The network management system will also allow users an automated interface for trouble reporting, electronic mail and provisioning updates. Cable & Wireless is also testing its new Bandwidth on Demand Service, which will allocate switched bandwidth as users require it.

Assumptions, other pitfalls

Too often, users overassume

capability when they are buying feature functionality from carriers. For instance, many carriers offer DS1 facilities with ESF; but this does not mean that the carrier will also provide the user with ESF reporting.

Also, users should not assume the carrier is always the best source for a particular function. For example, carrier multiplexing options simply have not kept up with changes in technology. M24 or M44 multiplexing from a carrier will allow a user to divide and route 24 or 44 channels, but this is not worth much in today's bandwidth-intensive world. The \$200 to \$1,000 users spend monthly on carrier multiplexing might be better spent on buying more sophisticated equipment of their own.

DACS is another option to be

evaluated closely. While the benefits of using DACS for disaster recovery or automatic reconfiguration are clear, there is the question of who can provide it better — the long-distance carrier or the local exchange carrier.

Several regional Bell holding companies have launched DACS services that provide for similar switching needs but are geared toward the intra-local access and transport area network. Users should determine the scope of the application, then see which product provides a better solution.

Finally, examine route diversity and automatic alternate routing. Don't assume that if service is supplied through two carriers, route diversity is assured. Many carriers buy capacity from one another and share the same circuits. Some carriers may provide

route diversity by using another fiber pair but in the same sheath; in this case, route diversity means very little. Ask to see the physical routing of the circuit.

What the future holds

One of the best indicators of where network management stands today is the user requirement for obtaining true alternate routing or reconfiguration. Most carriers will require the user to have existing facilities in place, and rerouting is then limited to switching circuits among those existing facilities.

In the future, effective rerouting must be flexible enough to provide service where no service exists now. The good news is that it will. Local access and interoffice transmission will be available on an on-demand basis.

With increasing digitization of the local and long-distance networks, transmission is getting more efficient and error-free. End-to-end, dynamic switching will become a reality, especially when fiber to the premises becomes more of a reality.

As users become more reliant on digital backbone services such as fractional T-1, T-1 and T-3, network management and user-controlled features will become more integrated on all levels.

As fractional T-3 services make their entrance, their functionality will be logically extended to provide similar management opportunity. Carriers will outfit their 3-3 DACS to provide T-1 on demand, in the same way that DS0 can be provided on demand now.

(continued on page 38)

I AM INTERESTED IN YOUR PRODUCTS AND WOULD LIKE MORE INFORMATION ON THE FOLLOWING PRODUCTS:

Bell Compatible Modems

- ☐ Dial-up (300-4800 bit/s)
- ☐ Private Line (1200-4800 bit/s)

Leased Line Modems

- ☐ 0-9600 bit/s
- ☐ 19.2 bit/s
- ☐ Diagnostic
- ☐ Multiplexed

Network Control and Management

- ☐ NCMS/PC 386 (Network Processor)
- ☐ SPN Diagnostic Leased Line Modems
- ☐ DSU/CSU

Central Site

- ☐ Intelligent Chassis
- ☐ Dial-up
- ☐ DSU/CSU
- ☐ Leased Line

Standalone Dial Up

- ☐ CCITT V.32 Modems
- ☐ CCITT V.22/V.22 bis
- ☐ 300-4800 bit/s

DDS-DSU/CSU

- ☐ 2400-9600 bit/s
- ☐ 56 K
- ☐ Standalone
- ☐ Card

(800) 222-4NEC

- ☐ Please mail information
- ☐ Please have your representative call me
- ☐ I would like a demonstration of equipment
- ☐ I have a product requirement in 6-12 mos.
- ☐ I have a product requirement in 0-6 mos.

NAME/TITLE _____

COMPANY _____

ADDRESS _____

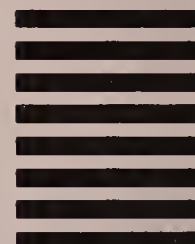
CITY _____ STATE _____ ZIP _____

TELEPHONE _____ EXT. _____ TELEX/TWX/FAX _____

☐ YES, I WOULD LIKE TO REMAIN ON YOUR MAILING LIST.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 7887 SAN JOSE, CA

POSTAGE WILL BE PAID BY ADDRESSEE

NEC America, Inc.
Data and Video Communication
Systems Division
Attn. Marketing Administrator
110 Rio Robles
San Jose, California 95134-1899 U.S.A.

OUR V.32 MODEMS WERE DESIGNED TO GO THROUGH HELL TO KEEP INFORMATION MOVING.



It's not unusual for temperatures to hit 110 degrees while ash rains from the sky at a typical fire camp. Lives are on the line. Your equipment better be up and running.

When the U.S. Forest Service decided upon NEC V.32 modems to help organize and transmit the massive amount of information necessary to move people and equipment, provide situation reports, coordinate air drops, and handle logistics, it was no fluke.

A major reason they chose NEC 9630 modems was their ability to transmit at the highest possible speed, virtually error-free, even over worst case lines.

Aside from that, our modems were carefully scrutinized for functionality, compatibility with existing equipment, ease-of-use and overall quality.

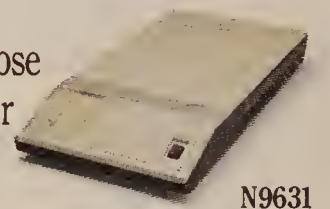
Obviously we passed the test.

When it comes time for you to decide which V.32 modem best fits your needs, be aware that no one has a more complete line than we do.

From the economical N9631 to the sophisticated N9635, you'll find advanced features such as remote configuration and monitoring, auto dial back-up, and complete diagnostics to name a few. To find out more, call us at 1-800-222-4NEC ext. 1277.

We realize you may never push your modems to the extremes the U.S. Forest Service does, but we're experts at putting out fires in business, too.

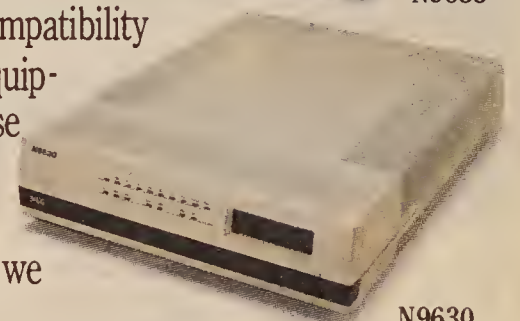
Photo courtesy of United States Forestry Services.
© 1989 NEC America, Inc.



N9631



N9635



N9630

NEC

See the FAXNeT Form on Page # 39

Voice-grade options

Company	Product	Voice-grade signaling (S) or echo cancellation (EC)	Voice-grade conditioning (C and D)	Voice-grade multipoint/drop bridging	DDS secondary channel service	DDS multipoint/drop bridging	DDS subrate multiplexing	M24 multiplexing	M44 multiplexing (IXC)	M13 multiplexing (IXC)	CCR-DACS, DACS	Route diversity	Automatic alternate routing	Fiber-only routing	CPE provided
American Private Line Needham, Mass. (617) 455-9000	Voice-Grade Analog	S/LEC rate, EC/\$0	LEC rate	No	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	N/A	Yes/\$0	Yes/\$0	Yes/\$0	Yes/ICB
ATC Boca Raton, Fla. (407) 750-2961	LaserNet 64	S/LEC rate, EC/LEC rate	LEC rate	Yes/\$40 NRC, \$14.60 MRC	N/A	N/A	N/A	LEC/LEC rate, IXC/\$450 NRC, \$450 MRC	N/A	N/A	N/A	Yes/ICB	Yes/ICB	Yes/\$0	Yes/ICB
AT&T Basking Ridge, N.J. (800) 247-1212	Voice-Grade Private Line	S/LEC rate	LEC rate	Yes/LEC rate	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	N/A	Yes	No	No	No
Cable and Wireless Communications, Inc. Vienna, Va. (703) 734-4534	Fiberpoint Voice/Analog Data	S/LEC rate, EC/\$0	LEC rate	No	N/A	N/A	N/A	LEC/LEC rate, IXC/\$850 NRC, \$250 MRC plus \$625 per card	N/A	N/A	N/A	Yes/15% of LEC rate	Yes/\$0	Yes/\$0	Yes/ICB
Consolidated Network, Inc. St. Louis (314) 993-9009	Voice-Grade Analog	S/LEC rate	LEC rate	Yes/LEC rate	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	N/A	Yes/10% of MRC	Yes/ICB	Yes/CP-specific pricing	Yes/ICB
Digital Signal, Inc. Southfield, Mich. (313) 356-2090	Multipoint	EC/\$0	No	No	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	N/A	Yes/\$0	No	Yes/\$0	No
MCI Communications Corp. Washington, D.C. (202) 887-3208	Voice-Grade Private Line	S/\$21.90 plus LEC rate MRC, EC/\$0	\$6 to \$35 plus LEC rate MRC	Yes/LEC rate	N/A	N/A	N/A	LEC rate/No, IXC/No	N/A	N/A	N/A	No	No	No	Yes/ICB
Metromedia/ITT Long Distance, Inc. Secaucus, N.J. (201) 330-5467	Voice-Grade Private Line	S/LEC rate plus 10%, E/\$0	LEC rate plus 10%	Yes/\$26 NRC, \$4 MRC	N/A	N/A	N/A	LEC/LEC rate, IXC/\$500 NRC, \$250 MRC	N/A	N/A	N/A	Yes/\$30 MRC	No	Yes/ICB	Yes/ICB
Norlight Madison, Wis. (608) 833-8332	Voice-Grade Analog	S/LEC rate, EC/ICB	LEC rate	Yes/LEC rate	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	N/A	Yes/ICB	No	Yes/ICB	Yes/ICB
Southwest Network Services, Inc. Austin, Texas (800) 999-2864	DS0	S/LEC rate, E/\$0	LEC rate	Yes/LEC rate	N/A	N/A	N/A	IXC/ICB, LEC/LEC rate	N/A	N/A	N/A	Yes/\$0	Yes/\$0	Yes/\$0	Modem, \$140 NRC, \$40 MRC
Telecom*USA Atlanta (404) 250-5980	FiberLink	S/LEC rate, EC/\$0	LEC rate	Yes/\$15 NRC, \$10 MRC	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	N/A	Yes/ICB	No	Yes/\$0	Yes/equipment-dependent
Transpoint Communications Los Angeles (213) 785-0660	LightPak (Voice-grade 32K bps)	EC/\$0	No	No	N/A	N/A	N/A	LEC/LEC rate, IXC/\$0	N/A	N/A	N/A	Yes/ICB	Yes/\$0	Yes/ICB	No
US Sprint Communications Co. Kansas City, Mo. (800) 877-6000	Clearline Voiceband	S/LEC rate, E/\$0	LEC rate	Yes/\$10 NRC each after first two, \$12 MRC each	N/A	N/A	N/A	LEC/No, IXC/No	N/A	N/A	N/A	No	No	Yes/\$0	No
Williams Telecommunications Group, Inc. Tulsa, Okla. (918) 588-3210	DS0 Service (VF Grade)	S/LEC rate, EC/LEC rate	LEC rate	Yes/LEC rate	N/A	N/A	N/A	LEC/LEC rate, IXC/No	N/A	N/A	N/A	No	No	Yes/\$0	No

CCR = Customer-controlled reconfiguration
CP = City pair (rate method)
DACS = Digital access and cross-connect system
DDS = Digital data services
ICB = Individual case basis

IXC = Interexchange carrier
LEC = Local exchange carrier
MRC = Monthly recurring charge
N/A = Not applicable
NRC = Nonrecurring charge

The information in this chart was provided by the carriers listed. Questions about chart listings should be directed to the individual carriers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

(continued from page 36)

Expect major carriers to offer more complete management options across their private-line products, not just for T-1. As these options become available, the differentiation of carriers will become greater, helping to bury the concept of private lines as generic goods. Resellers will find it difficult to compete with this and will be largely relegated to providing pipes of capacity.

The biggest issue for private-line management is the same one that everyone is grappling with these days: providing management for all of the network management. The optimal solution is to get a network management system that can talk with private-line, virtual network, equipment and other management systems. This is the challenge for the '90s, if not for the following decade. ■

Con

continued from page 25

Dominance is not measured principally by market share, but rather by market power. In classic economic terms, market power is generally defined as the ability to raise prices above competitive levels without losing business and the ability to bar potential competitors from entry into the market. By this standard, AT&T does not have market power. Fierce competition has driven prices down, not up. Even with lower prices, AT&T has lost business.

And AT&T certainly hasn't barred entry to the market. On the contrary, the FCC reports that approximately 500 interexchange carriers are now operating in the country. This variety of competitors provides users with a

multitude of choices.

Equally important, competitors have more than ample capacity to meet the demands users place on them. A recent working paper from the FCC's Office of Plans and Policy concluded that AT&T's rivals could together provide 146% of the capacity needed to meet the needs of the long-distance market. The same paper noted that AT&T has only 40% of the combined capital assets of all the competitors in the long-distance business.

The question is simple: How can AT&T have market power when users have so many choices for their telecommunications services? How can AT&T have market power when no one is barred from entering the market and competitors have the capacity to serve the entire market?

Clearly, users have been the

beneficiaries of competition in this industry. They've enjoyed a 40% drop in basic long-distance prices since 1984 and have seen a wide array of new services brought to market at an unprecedented pace. Competition, not regulation, has delivered these benefits.

Hardly a week goes by without an announcement by US Sprint Communications Co. or MCI Communications Corp. of yet another multimillion-dollar contract with a major business customer. These very same competitors invariably protest whenever AT&T signs up a major customer for a custom network offering. It's instructive to note that throughout the Tariff 12 controversy, none of AT&T's users have ever protested; only its competitors have.

It is long past time to remove

the unfair burdens on AT&T as the dominant carrier — not because it hinders AT&T, but because it impedes AT&T's ability to serve users and to ensure that the marketplace enjoys the full benefits of competition. The conditions that caused the FCC to apply the dominant carrier label to AT&T have long since disappeared. The designation is an anachronism that benefits AT&T's competitors at the expense of users and a truly competitive marketplace.

The answer is simple: Let's allow competitors to compete on their marketing prowess, not on their regulatory gamesmanship.

Customers certainly see open competition as advantageous. That is the bottom line: doing what is right for the users of telecommunications services in this country. ■

FAXNeT is a service designed to help readers of *Network World* gather important information via FAX on products and services advertised in *Network World*.

How to Use FAXNeT

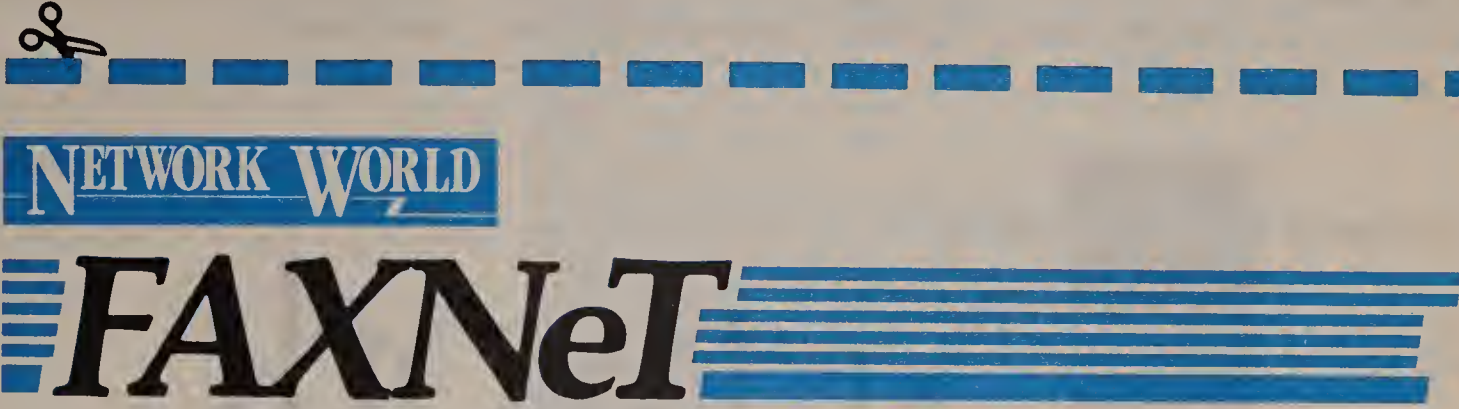
Listed below in the FAXNeT Directory are the FAX numbers of participating advertisers in this week's issue of *Network World* and the page number where the ad appears. To use FAXNeT cut out the FAXNeT form and make a copy of the form for each inquiry you want to make. Then just FAX it to the vendor's number listed in the FAXNeT Directory.

Benefits to the *Network World* Reader

FAXNeT is designed to get you product and service information FAST. And, if your request is urgent and requires an immediate response from the vendor just check the "Urgent" Box.



Company	Page
Andrew Corp.	16
Fax: 708-349-5943	
Emulex	14
Fax: 714-241-0792	
General Datacomm.....	31
Fax: 203-758-8507	
IDG/Comnet.....	13
Fax: 508-872-8237	
Informer.....	3
Fax: 714-898-2624	
Micom.....	5
Fax: 805-583-1997	
NEC America	37
Fax: 408-433-1239	
Systems Center	7
Fax: 703-264-1312	
Telebit	41
Fax: 415-969-8888	
Teletutor	45
Fax: 603-431-0776	
UniForum	45
Fax: 312-299-1349	
Warwick Data Syst.....	46
Fax: 201-586-3080	
Western Digital.....	10
Fax: 714-863-9326	



Attention: Marketing Communications Manager

Subject: This inquiry was generated by a *Network World* reader who is responding via FAX to your advertisement in *Network World*.

Name _____ Title _____
Company/Div _____
Address _____
City _____ State _____ Zip _____
Phone _____ FAX _____

☐ **URGENT**

- Action Requested**
- ☐ Request for Sales Call
 - ☐ Request for Proposal
 - ☐ Request for Information

- Purchase Timeframe**
- ☐ Within 60 Days
 - ☐ Within Six Months
 - ☐ Within One Year

- Scope of Purchase Responsibility**
- ☐ Enterprise Wide
 - ☐ Departmental

- Purchase Influence/Number of Sites**
- ☐ One Site
 - ☐ 2-9 Sites
 - ☐ 10-20 Sites
 - ☐ 21+ Sites

Product Advertised: _____

Intended Application: _____

closest competitor, MCI, has an overall 12% market share — which is only one-sixth the size of AT&T's share. There are few, if any, examples of highly competitive industries in which such a market share gap exists among the leading players.

Revenue is another important factor to consider in measuring competitive power in an industry. Even today, in an industry growing at 10% per year, AT&T's total revenue is 10 times larger than its nearest competitor's. AT&T uses these overwhelming statistics to its advantage by playing a numbers game. When building its case for deregulation, AT&T likes to cite 68%, which is its market share in switched minutes of traffic as reported by the FCC.

However, when Wall Street is listening, AT&T cites a number closer to its actual 70% to 75% market share. This number includes the high volume of traffic carried over private lines and private networks — services not included in the FCC reports and in which AT&T controls the lion's share of the business.

Faced with the prospect of further market share losses as competitors enter newly opened markets, AT&T says full and fair competition now exists and it should be accorded equal treatment with MCI and the other nondominant carriers. But the practical effect of full deregulation of AT&T would be very special treatment indeed.

This is because legal and economic disparities favoring AT&T remain, despite the overall growth of competition in the industry. If granted a regulatory blank check,

AT&T would still have the power to take advantage of its privileged position to prevent rivals from competing with it — to the detriment of the entire user community.

Premature deregulation of AT&T could stifle the steady progress of competition in several key market segments where it retains residual monopoly advantages. For example, pay phone competition is still in its infancy, and competition in operator services, international direct dialing and 900 service is only now beginning to grow.

Another little known residual advantage is AT&T's special network facility agreements. Now under FCC investigation, these agreements with local phone companies — also a result of divestiture — have allowed AT&T to pay \$2 billion less than its competitors in special access fees for local interconnections.

Portability of 800 numbers is another potential trouble spot. AT&T's control over toll-free numbers dates back to predivestiture days, when many of these numbers were issued. Today, customers who have invested heavily to promote their AT&T 800 numbers find they must give them up if they switch to another carrier. Portability of 800 numbers is crucial to full competition in this important and growing segment of the industry. Yet it may be some time before the regulatory and technical issues are resolved.

To maintain its present toll-free market advantage, AT&T has used another ploy: traffic aggregators. Through contractual arrangements with these traffic aggregators, AT&T markets special volume discounts to 800 service users that have left or threaten to leave the AT&T fold. In fact, AT&T has actually provided aggregators with win-back lists of customers that were lost in open competition. Interestingly, such special discounts are not marketed to its other, captive customers.

AT&T's international advantages stem from the fact that it was the de facto monopoly carrier for years, and it has the individual operating agreements with countries to prove it. Even AT&T admits that its international market share is 85% to 90%. While there is growing competition in this market, most carriers are dependent on AT&T for ubiquitous international terminations and must pay the carrier in order to offer comparable worldwide services.

These and other built-in advantages enable AT&T to leverage its market position through a number of anticompetitive strategies. An obvious example is AT&T's bundling of regulated services with unregulated services in Tariffs 12 and 15. AT&T has effectively used its stature in the unregulated equipment business by providing free or reduced-price equipment to leverage sales of its regulated transmission services.

This is where the existing regulatory rules come into play. When enforced, these rules minimally assure the FCC, competitors, the user community and the general public that AT&T cannot use its market position to win business other than through fair and legitimate competition. Such an obviously benign purpose could be viewed as burdensome only by a former monopoly that thinks it has a divine right to a dominant market share.

Ironically, all the sound and fury generated by AT&T over equal treatment overshadows the fact that just this year, the FCC granted AT&T a dramatic degree of deregulation through price caps. AT&T can now make most tariff changes on two weeks' notice — with no cost support. This is exactly the degree of regulation the FCC once specified for nondominant carriers.

Add to this the FCC's recent treatment of AT&T's illegal Tariff 12, 16 and promotional offerings, and it's hard to figure out why AT&T is complaining. This is not exactly the profile of a firm being unduly constrained by onerous regulations.

At divestiture, equal doses of regulation and competition were prescribed as a cure for an industry suffering from an infectious disease known as monopoly. While the industry has responded admirably, some regulatory treatment is still required to give competitive forces a fighting chance across *all* segments of the industry.

The day when the FCC will no longer need to watch for outbreaks of dominant carrier abuse won't be brought any closer to reality by regulatory sleight of hand, public relations gambits or semantic gamesmanship. **Z**

EDITORIAL

REPRINTS

FROM

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

For information on ordering reprints contact:

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

REPRINTS

Network World

Highlight your editorial coverage!

Coverage of your company's news or product introductions in *Network World* means valuable exposure in the enterprise networking marketplace. Build on the positive awareness by ordering your reprints today.

Editorial reprints make great leave behinds for:

- Press
- Sales Prospects
- Company Seminars
- Trade Shows
- Distributors
- Internal Meetings

Reprints are available in various quantities* and can be customized to include your company logo, address and sales office listings.

*Produced in minimum quantities: 500 for black & white or two-color, 1,000 for four-color reprints.

Donna Kirkey
Reprint Department
Network World, Inc.
375 Cochituate Road
Framingham, MA 01701-9171
Tel. 508-820-2543

Merrill Lynch to sign MCI as lead carrier
Five-year, \$150 million contract, MCI's largest ever, promises to save brokerage \$10 million a year.

Merrill Lynch's planned
The company is planning to build a new network of 100,000 lines, which will include a major expansion of its T-1 lines. The company is also planning to build a new network of 100,000 lines, which will include a major expansion of its T-1 lines. The company is also planning to build a new network of 100,000 lines, which will include a major expansion of its T-1 lines.

Higher and higher
Network World's fourth annual survey reveals the budget expectations of communications managers.

Fractional T-1 offers users savings, design options
Buying backbone bandwidth in 64K bps blocks makes it more economical to build mesh nets.

Telebit has a modem for the job. Whatever the job.

Product	Standards			Error Correction		Compression		Protocol	Environment	
	Low-Speed	High-Speed		MNP*	16-bit CRC	MNP 5	Lempel-Ziv	UUCP, Kermit Xmodem, Ymodem	Async	Sync
	103J, 212A V.22, V.22bis	PEP	V.32							
T1000	■	■		■	■	■		■	■	
TrailBlazer Plus	■	■		■	■	■	■	■	■	
T2000	■	■		■	■	■	■	■	■	■
T2500*	■	■	■	■	■	■	■	■	■	■

*also includes V.21 and V.23

No matter what your communications requirement, you'll find a Telebit high-speed, dial-up modem that can do the job. At prices starting from \$745. Just complete and mail back this card. We'll do the rest.

Name_____

Title_____ Company_____

Address_____

City_____ State_____ Zip_____

Phone_____

I'm interested in the following modems:

_____ T1000 _____ TrailBlazer Plus

_____ T2000 _____ T2500

_____ Please have a sales person call.



NW M10B



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 57 MOUNTAIN VIEW, CA

POSTAGE WILL BE PAID BY ADDRESSEE:

Telebit Corporation

1345 Shorebird Way
Mountain View, CA 94043-1329



Router links Apple LANs at high speeds

continued from page 23
net to do protocol conversion.

"For larger corporate users, this means we can provide a pathway for the entire internet," said Mark Doyle, president of Engage Communication.

GE is using SyncRouter to link offices in Connecticut, New Jersey and New York on a point-to-point basis over 56K bit/sec leased lines, primarily for exchange of electronic mail, including E-mail with files attached, Mack explained.

Last November, GE installed SyncRouter, replacing a complex configuration using routers, Ethernet cabling and bridges. At a cost of \$1,895 per router, SyncRouters have cut GE's cost by about \$30,000 per connection while performing the same functions. The earlier configuration cost \$35,000 for two sites, compared to less than \$5,000 today.

Between Bridgeport and Princeton, N.J., which has a multivendor LAN with low-speed dial-in and dial-out capabilities, the SyncRouter has not performed adequately, Mack said.

The SyncRouter in this setup has failed, possibly because it was slowed by low-speed devices such as modems, Mack explained. He also said the failures could be the result of an integration problem or may be hindered by a problem specific to third-party equipment. Nonetheless, the vendor has "provided outstanding support," Mack said.

SyncRouter is available now.

Engage can be reached in writing at 756 Marlin Ave., Suite 4, Foster City, Calif. 94404; (415) 358-0264. **■**

CSX unfolds unique plan for net move

continued from page 6

until it installs Version 5 Release 3 of IBM's Network Control Program (NCP) on its front-end processors. That version of NCP is required to support 16M bit/sec Token-Rings, Register said.

The Token-Ring backbone is tied via a Token-Ring Interface Coupler (TIC) to a 3745 front end located in the company's existing Jacksonville data center.

To emulate the remote data center configuration, the company has the front end attached via dual T-1 lines to another 3745 which, in turn, is channel-attached to the mainframe complex. The T-1s are supported by a Network Equipment Technologies, Inc. Integrated Digital Network Exchange (IDNX) T-1 multiplexer.

When the data center is moved, the company will program the IDNX to switch the two T-1s to another IDNX node at the new data center, then terminate those lines in a larger 3745 Model 210 Communication Processor.

Besides saving money, the Token-Ring strategy offers advantages in terms of disaster recovery, Register said. If a disaster struck the new data center, the company could recover the Jacksonville NCPs using its other mainframes in Baltimore or Elizabeth, N.J. In addition to cluster controllers, the Token-Ring backbone will link a total of 16 departmental Token-Ring LANs, eight in each of its two buildings here.

Communications servers on the backbone Token-Ring will give the departmental LAN users links to other LANs at CSX sites in Baltimore, Elizabeth, Richmond, Va., and Washington, D.C. **■**

Antenna improves int'l communications

continued from page 21

of staff of the Transportation Department's research and special projects administration. "We think this technology can make transportation services in the U.S. more productive and more competitive."

Critical to the success of the project was the new satellite antenna, which was manufactured by Ball Corp., based in Muncie, Ind. Satellites have not been used to communicate with airplanes in the past because the antennas are typically too bulky to be practical. The new, smaller satellite antenna could change that.

"I think that eventually, every airline will use them because they're a lot better

than the radio communications we use now," said Capt. David Haapala, director of flight standards for future programs at Minneapolis-based, Northwest Airlines, Inc.

Satellite communications could be a particular boon in the transoceanic arena where communications with in-air flights is limited to approximately once an hour to conserve scarce radio frequencies. Air traffic controllers rely on radio contact with pilots to track transoceanic flights, which typically cruise beyond the range of land-based radars.

Because position statements are so infrequent and voice communications via radio are often garbled, air traffic controllers leave wide spaces between airplanes to compensate for error. Haapala said that satellite communications could let air traf-

fic controllers cut this space in half, thus allowing airlines to fly more transoceanic flights.

Dowis added that ground-based maintenance crews could use satellite communications to monitor the status of cargo and mechanical operations of airplanes in flight. This could be used to warn engineers that major repairs are needed before a plane lands, letting airlines get a plane back in flight more quickly and allocate resources more efficiently.

"Airline executives who I've talked to say this could cut their operations expenses by 10%," Dowis said.

This spring, Northwest and Chicago-based United Air Lines, Inc. plan to become the first domestic airlines to use satellite communications on commercial flights, Haapala said. **■**

Not only does Telebit make the world's fastest modems, we also endorse your checks.

If you're looking for a high-speed, dial-up modem that endorses industry standards and more, check out the Telebit® T2500.

As well as transmitting data error-free at a lightning-fast 19,200 bps with Telebit's PEP™ modulation, the T2500 also adds V.32 to its modulation list. That means you can automatically use the CCITT V.32 standard for synchronous or asynchronous connections.

So, for large-volume or interactive transmissions, you won't find a better modem than the Telebit T2500. It supports all major modem standards, and is ideal for connecting micros to LANs or mainframes. Plus it easily handles international transmissions. And speaks fluently with more dial-modems than any other.

In addition to the industry's highest data rate, Telebit's multicarrier PEP technology makes hang-ups and bad line problems a thing of the past.

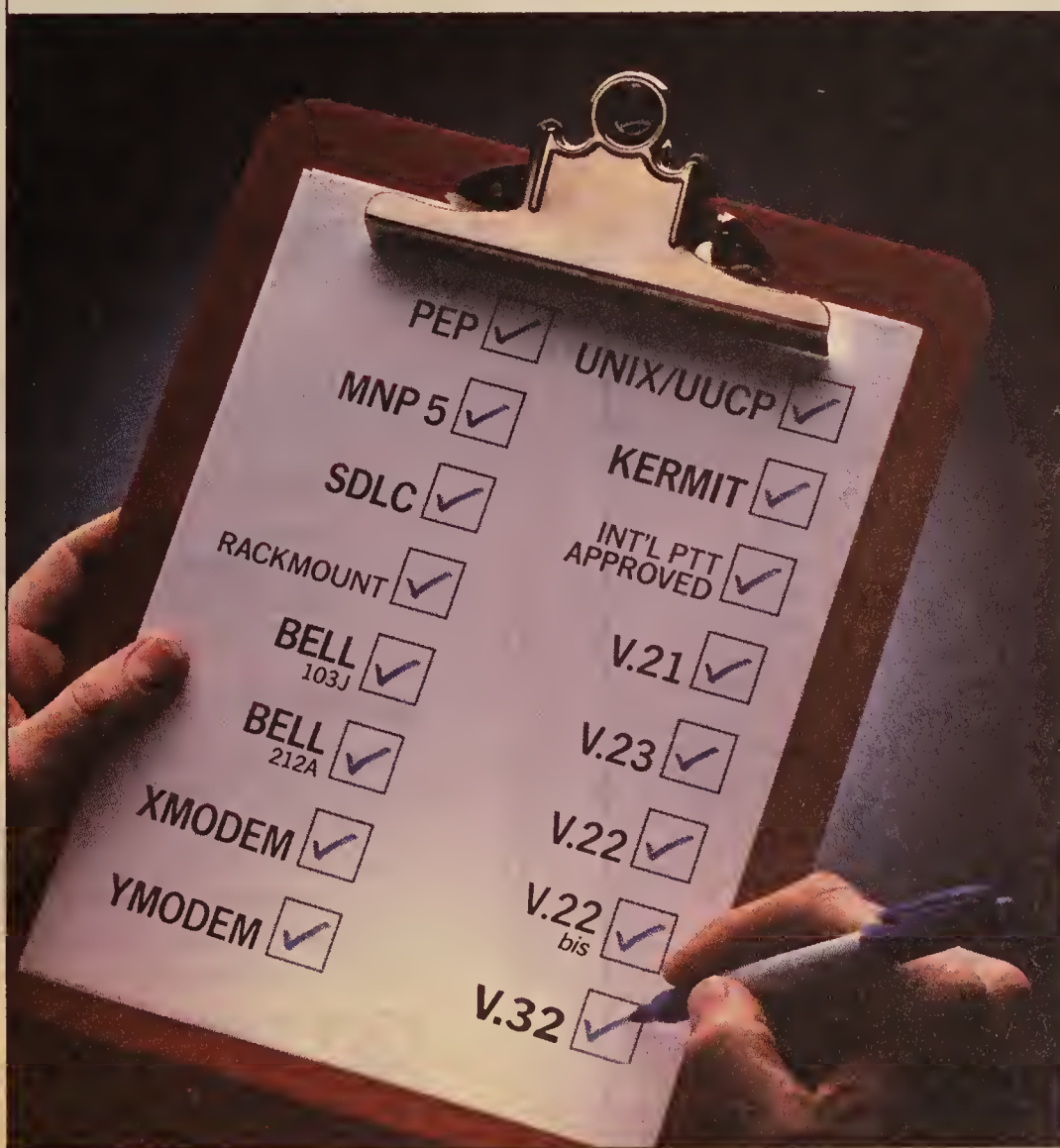
To find out more about the world's fastest modem, call 1-800-TELEBIT today. Or write us at 1345 Shorebird Way, Mountain View, CA 94043-1329. Phone: (415) 969-3800.

Learn why no one gets the message through like Telebit.



© 1989 Telebit is a registered trademark and PEP is a trademark of Telebit Corp. MNP is a registered trademark of Microcom, Inc. Other product names are trademarks of their respective holders.

See the FAXNet Form on Page # 39

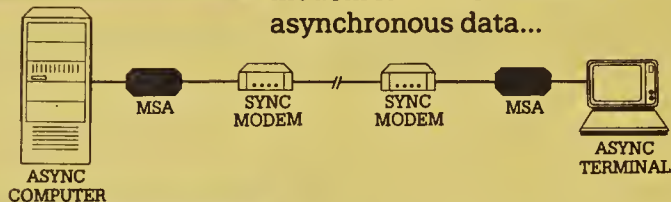


DATA COMMUNICATIONS

RAD TO THE RESCUE.



THE PROBLEM: You want to use a synchronous modem for transmission of asynchronous data...



THE SOLUTION: RAD's miniature async to sync converter, MSA-1, enables connection of async equipment to sync channels.

The MSA-1 performs the async to sync conversion in compliance with V.22 bits standard, accommodating differences in frequency between the async port and sync modem. It automatically adjusts to data rates up to 19.2 kbps and accommodates all async character formats. Delivered complete with cable and connectors, the MSA-1 is easy to install and operates without AC power.



RAD

From the growing Rad family.

data communications ltd.

U.S. Headquarters

151 West Passaic St., Rochelle Park, NJ 07662, Tel: (201) 587-8822, Telex: 6502403647 MCI, Fax: (201) 587-8847

Circle Reader Service No. 11

NETVIEW-NET/MASTER NETWORK MANAGEMENT

NetView Goes To NEW Places

With NetQuest's new products, NetView is going where it has never been before. NetQuest introduces a new way of using standard NetView (or Net/Master) in management of non-SNA networks. This new method expands NetView modem and DSU/CSU management into network configurations not manageable until now.

NetQuest Expands NetView Management Into:

- SNA/LPDA lines with non-IBM modems or DSU/CSU's.
- Unisys, DEC, CDC or other non-SNA host's sync and async lines.
- Remote IBM AS400, System 38, Series 1 and similar lines.
- SNA over X.25 lines (SNA, NPSi and QLLC).

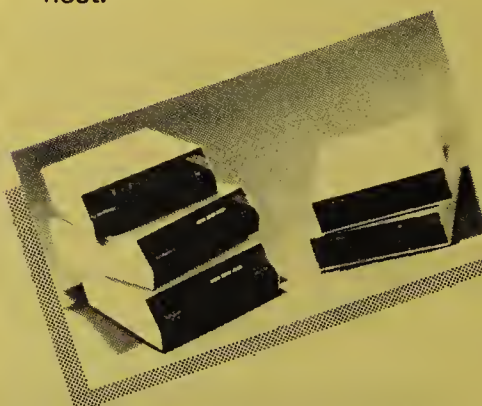
LPDA CONTROLLER for integration of non-IBM modems and DSU/CSU's into NetView.

V.32 MODEM industry's first V.32 NetView modem with NetView diagnostics, VTAM and NetView dialing.

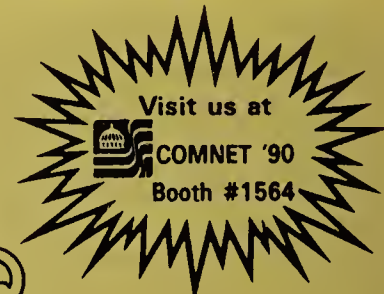
DSU/CSU for DDS lines with NetView primary channel diagnostics, speeds to 56 Kbps.

LDM point-to-point, multipoint and tail circuit private line modem, speeds to 72 Kbps.

NetQuest transmission products link directly to NetView (NCP) and are not NetView PC based. They perform LPDA diagnostics and functions necessary to allow non-SNA networks to transmit NetView LPDA diagnostic messages. SNA or non-SNA lines may be controlled anywhere in the network regardless of the location of the NetView host.



NetView® is a registered trademark of IBM Corporation.
Net/Master® is a registered trademark of Cincom Systems, Inc.



NetQuest Corporation

129H Gaither Drive, Mt. Laurel, NJ 08054
(609) 866-0505 • FAX (609) 866-2852

Circle Reader Service No. 9

ANALYZE DATA LINE PERFORMANCE

Analyze Data Line Performance

The PC-based PA1 Performance Analyzer lets you analyze over 35 network parameters using easy-to-read color graphics and printed reports. Response time, exception and over-threshold reports help you quickly find problem areas. Line utilization data reveals overloaded equipment and underused capacity. Know what's happening on your data lines. Call us for our PA1 demo or a 15-day free product trial.

- Reveal utilization trends.
- Measure response time.
- Plan network evolution.
- Troubleshoot contention problems.
- Evaluate transaction impact.
- Analyze network changes.
- Choose SNA, Bisync, X.25, or Burroughs poll/select.



Progressive Computing, Inc.
814 Commerce Drive, Suite 101
Oak Brook, IL 60521-1919 USA
(708) 574-3399 FAX (708) 574-3703

Circle Reader Service No. 1

DATA COMM MATRIX SWITCH

NEW DIMENSIONS Distributed Tandem Matrix Switch

LARGEST CAPACITY Smallest Size lowest cost

MTRX-500	512 Ports up to 64 Kbps	7 1/2"
MTRX-4000	4096 Ports up to 64 Kbps	15"
MTRX-8000	8192 Ports up to 64 Kbps	28"

Salient Benefits:

- Fractional T-1, from 64 Kbps to 2.048 Mbps
- 98% Cable Reduction, Twisted Pair 4000 ft DTE to DCE
- LAN-based PC Control - Ethernet or Token Ring
- NetView PC or Cincom NetMaster Universal Workstations
- User-Controlled Database - dBase III PLUS or dBase IV
- Integral BERG/BERT and S.A.M. Test Functions
- 30,000 ports installed at RBOCs and Fortune 1000 Companies



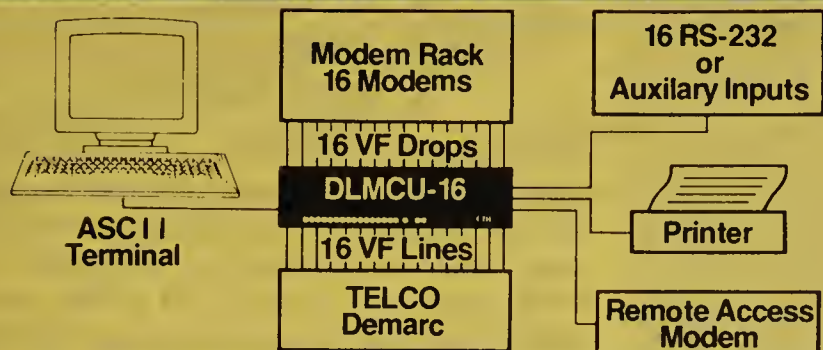
Datacomm Management Sciences Inc.

"The Responsive Ones"
Norwalk, CT 203-838-7183
FAX: 203-838-1751

Circle Reader Service No. 10

DIAL-UP MANAGEMENT

Dial Modem Management for Small Networks



- Modem Vendor Independent.
- Auto Swap of RING NO ANSWER.
- Auto Busy Out of RING NO ANSWER.
- Start with 16 or less & Expand up to 128.
- Remote Site with Dial up Access.
- Real Time Trouble Reports.
- Daily Summary Reports.
- Low Cost Wrap Around.

CDI

Communication Devices Inc.

One Forstmann Ct.
Clifton, NJ 07011
Phone: (201) 772-6997

Fax: (201) 772-0747

See us at Comnet
Booth # 3105

Circle Reader Service No. 12

LAN AND WAN CONNECTIVITY

PLUG DIRECTLY INTO HIGH-SPEED DIGITAL SERVICES.

NEW

P R O M P T U S[®] I
AT Bus-compatible WAN Adapter



On Board T1 CSU/DSU

- Provides fully integrated access to:
T1: 1.544 Mbit/s
FT1: 56 to 1536 Kbit/s
CEPT: 2.048 Mbit/s
Primary Rate ISDN
Switched 56 with T1 Access
- On board CSU/DSU eliminates external equipment, lowers costs.
- Applications include network gateways, routers, LAN bridges, facsimile servers, switches, graphic file transfer and more.
- Efficient shared memory interface.
- Greatly reduces network file transfer time.
- Includes X.25 file transfer software.
- Plugs into single 16-bit PC/AT slot.

Call or write for complete information:

P R O M P T U S

Promptus Communications, Inc.
Portsmouth Business Park, Portsmouth, RI 02871
Tel: (401) 683-6100 FAX: (401) 683-6105

Circle Reader Service No. 2

ETHERNET LINE MONITOR

NetLight-1

ETHERNET[™] / IEEE 802.3
Attachment Unit Interface Line Monitor

- Provides On-Line Network Status Indication
- Provides Valuable Troubleshooting Information
- Easy to Install

NetLight-1 is a line monitor for the ETHERNET[™] or IEEE802.3 Attachment Unit Interface. It is available in two versions.

Version A provides LED's that indicate when a station is transmitting, receiving, or experiencing a Signal Quality Error. Version B provides these same indicators and also provides connectors for attaching an oscilloscope to monitor the signal waveforms. This simple device is useful for both troubleshooting and for providing immediate feedback of network status to the station operator.



For Additional Information or to place your order for Netlight-1
please call 1-800-525-2141 or contact:

Knowledge Implementations, Inc.

32 Conklin Road, Warwick, New York, 10990 (914)986-3492 FAX (914)986-6441

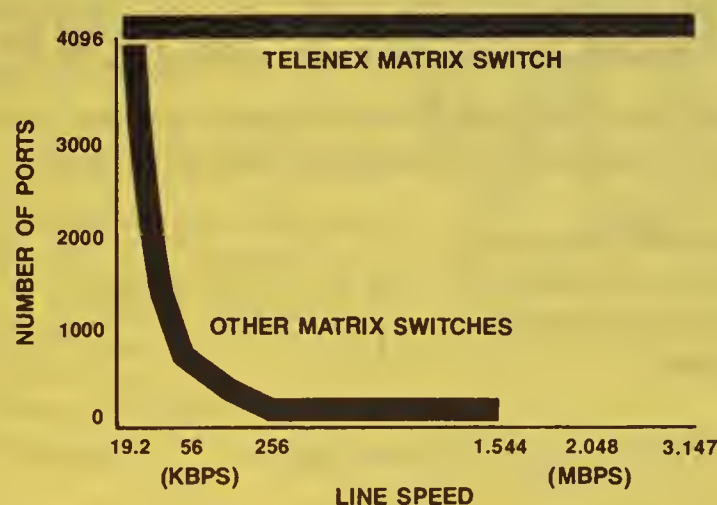
Dealer and OEM Inquiries Welcome
Quantity Discounts Available
Visa and MasterCard Accepted
In Stock for Immediate Delivery

Circle Reader Service No. 13

MATRIX SWITCHING

... TELENEX Matrix Switches

Speed and Capacity
that Exceeds All Others



TELENEX
CORPORATION
A UNIT OF GENERAL SIGNAL

(609) 234-7900 • TELEX 710 897 1648 • FAX (609) 778-8700
13000 MIDLANTIC DRIVE • MOUNT LAUREL, NJ 08054
Circle Reader Service No. 3

NETWORK PLANNING SOFTWARE

GrafNet provides instant visual displays of
network topologies...

PC software allows easy viewing of network configurations.

Features

- * Built-in database automatically converts Area code/Prefix to an on screen geographical location.
- * Add and delete lines and nodes through user friendly Microsoft Windows interface.
- * View topology nation-wide or on a state by state basis.
- * Zoom in on a geographical area for closer viewing.

Applications

- * Simplify mapping of voice/data networks.
- * Create documents of network configurations for proposals and presentations.
- * Create visual pictures of network topologies.
- * Maintain a network configuration database.



Price \$450

(408) 446-9598

Call today for information and free demo disk.

Network Dimensions, Inc.
5339 Prospect Road, Suite 122, San Jose, CA 95129

Circle Reader Service No. 4

Send For Free Info

NW Jan 90

For more information on any of the products and services advertised in *NetworkWorld's ActionCenter*, circle the Reader Service Numbers on this coupon which correspond to the advertisement of interest to you.

Complete the coupon information and mail to:

NetworkWorld

P.O. Box 5090, Pittsfield, MA 01203

(Expires 4/30/90)

Name _____	1 2 3 4 5 6 7 8 9
Title _____	10 11 12 13 14 15 16 17
Company _____	18 19 20 21 22 23 24 25
Phone () _____	26 27 28 29 30 31 32 33
Street _____	34 35 36 37 38 39 40 41
City _____	42 43 44 45 46 47 48 49
State _____ Zip _____	50 51 52 53 54 55 56 57

NW Jan 90

NETWORK SCANNING AND MONITORING

Cable Scanner

Pinpoint Network Cable Faults Fast!

The Scanner is a monitor, fault finder, cable locator and much more. Helps you pinpoint the location of shorts, opens or breaks. Its 32 character display reports the fault in plain English "short at 306 ft". With an oscilloscope, Scanner's high speed, pulse generating circuitry gives a detailed view of the entire LAN including transceiver, terminator and multiple faults.



- * Cable length measurements
- * Locate breaks, shorts, opens, bad crimps, etc.
- * LAN activity monitoring
- * Find cables in ceilings, walls, floors
- * Cable TV troubleshooting
- * Generate as-built drawings and specifications
- * Isolate faulty network interface cards
- * Very simple to operate



M-Test Equipment
P.O. Box 460008
San Francisco, CA 94146-0008

Call for Info

Outside CA: (800) 334-4293
Inside CA: (415) 861-2382
FAX: (415) 864-1076

Included is Tracer for locating exactly where in the floor, ceiling, wall or patch panel the cable lies. Cable Scanner, Tracer and Operators' Manual are only \$1495.

Circle Reader Service No. 5

STRATUM 1 SOURCE

AUSTRON MODEL 3150



PRIMARY SYNCHRONIZATION

- RELIABLE
- FLEXIBLE
- AFFORDABLE

The Model 3150 Communications Network Synchronization System provides an independent on-site timing source for your telecommunication network. The 3150 gives you STRATUM ONE timing stability and accuracy in a broad variety of configurations. This system is used around the world in civil and military networks. Call today:

AUSTRON Inc.
a DATUM company

P.O. BOX 14786-EXIT 248, N. IH35 AUSTIN, TX 78761
TELE(512)251-2313/TWX(910)874-1356/FAX(512)251-9685

Circle Reader Service No. 6

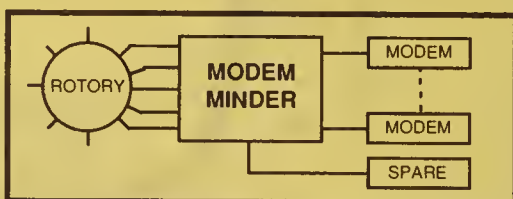
PREVENT HUNGROUP LOCKOUT

Lost Calls = Lost \$

RING - NO - ANSWER PROBLEMS SOLVED!

Dataprobe's Modem Minder detects failures in modem hunt groups and automatically takes corrective action.

Automatic Switching
to Spare Modems or
Busy-out Defective
Modems.



Low Cost

Expandable

Ideal for 800#s



170 COOLIDGE AVENUE
ENGLEWOOD, NEW JERSEY 07631
(201) 569-6464 FAX (201) 894-0939

Circle Reader Service No. 15

TESTERS

T1 monitoring in the palm of your hand.



- Unframed, SF and ESF formats
- Detect T1 errors and alarms
- Display DSO data and signaling bits
- Monitor audio on selected channel
- D3/D4, D1D and D2 compatible

\$795

Circle Reader Service No. 7



Electrodata, Inc.

23020 Miles Road
Bedford Heights, Ohio 44128
Call Toll Free 1-800-441-6336
(216) 663-3333 TWX (810) 427-2280
FAX (216) 663-0507

SOFTWARE

Manage & Monitor Your

NOVELL

Network

NEW

With **NETCOMPANION**

NetCompanion is an integrated set of 16 unique network management & monitoring utilities designed for Novell Network*.

Use NetCompanion to:

- Gather and graphically display network performance statistics
- Isolate network problems to a single workstation
- Control the server from the command line of your workstation
- Protect users from running applications improperly
- Solve a wide range of network management problems

Only **\$349!**

ETI Software

2930 Prospect Ave., Cleveland Ohio 44115

Call **800-336-2014**
or **216-241-1140**

*Requires Novell Network version 2.1 or above - Network * Novell, Inc.

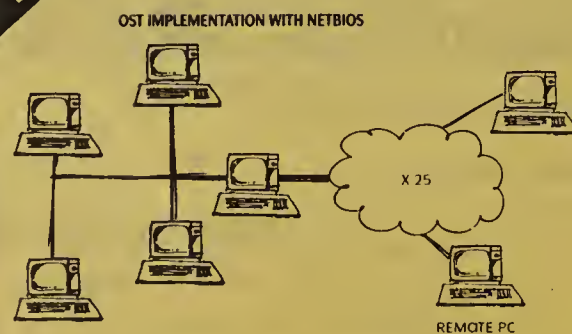
Circle Reader Service No. 16

X.25 PC CONNECTIVITY

See us
at Comnet
Booth 1175/1177

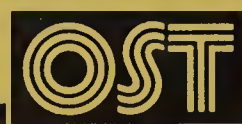
ATTENTION LAN MANAGERS!

Are you operating NETBIOS within your LAN?



The PCXNet Card can expand the capabilities of your local area network... allowing a remote PC to connect to a LAN utilizing NETBIOS via an X.25 network interface. Developed by OST, PCXNet Card also provides advanced communications using CCITT X.21, X.25 and X.32. For a list of features provided by the PCXNet Card and other innovative products offered by OST, call today!

OST, Inc.
14225 Sullyfield Circle
Chantilly, Virginia 22021
(703) 817-0400



Circle Reader Service No. 17

Networking Intelligence

NETWORKING MARKETPLACE

SOFTWARE



January 23-25, 1990
Washington Convention Center
Washington, D.C.

Whether you're a business/government end-user, OEM, reseller, systems integrator or technical expert, UniForum 1990 is your one-stop source for the latest UNIX system information. More users attend, and more vendors participate in UniForum than any other UNIX system event in the world.

The UNIX® Operating System...is the key to open computer systems. UNIX delivers total interoperability—over a diversity of hardware platforms—with complete networking capabilities—invaluable for workgroup (multiuser) computing—as well as single-user multi-tasking applications.

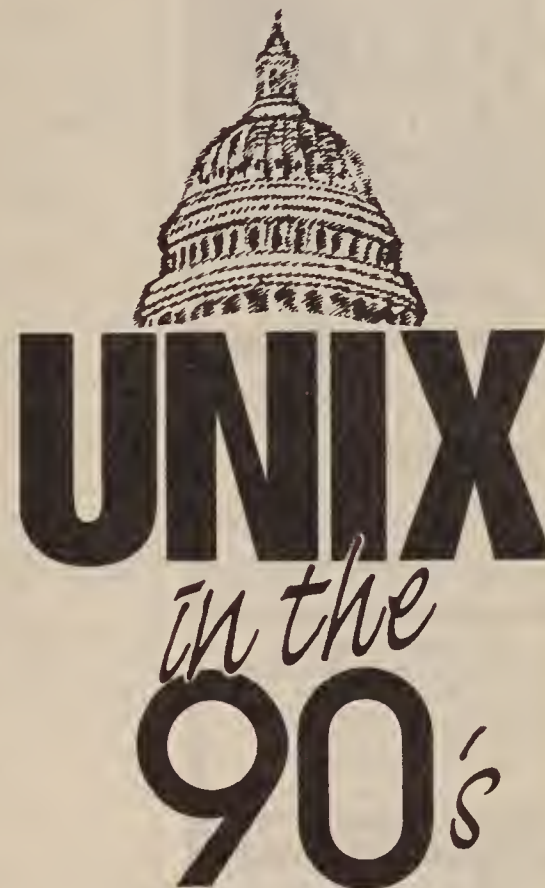
More Exhibitors...250 national and international vendors, in 120,000 square feet of exhibit space, make UniForum 1990 the largest UNIX system event ever presented.

More Conferences...the 1990 UniForum educational agenda includes 20 all-day tutorials, providing basic in-depth UNIX system information, plus 47 conference sessions, with marketing- and industry-oriented panel discussions and technical presentations.

More FREE Workshops...sixteen 90-minute UNIX system introductory workshops, chaired by industry experts, will cover *Integrating MS-DOS and UNIX*, *Introduction to UNIX (for managers/users)*, *UNIX security*, *UNIX networking* and more.

UniForum 1990...advance registration for exhibits is FREE. And advance conference/tutorial registration saves you money! Call **800-323-5155** today for complete details and registration forms. In Illinois and outside U.S., call 312-299-3131 (after November 11, 1989, call 708-299-3131).

UniForum 1990
2400 East Devon Avenue • Suite 205
Des Plaines, Illinois 60018 USA



DECADE OF THE USER

See the FAXNeT Form on Page #39

Sponsored by



Buy, Sell Or Announce Through Network World's Classified Section

Buying or selling communications-related products or services?

Or do you want to announce
an upcoming event or business opportunity?

If so, Network World's classified section is the right choice for you.

You'll reach more than 70,000 communications/networking professionals all of whom are buying decision makers.

And you'll reach them every week.

Find out just how effective and cost efficient
Network World classified advertising can be.

For all the facts write or call: Network World, Classified Advertising

Joan Bayon Pinsky, 161 Worcester Road,
PO Box 9172, Framingham, MA 01701-9172
800-622-1108 (in Mass., 508-875-6400)

Pacific & Mountain: Susan Egan,
18008 Sky Park Circle, Suite 145, Irvine, CA 92714
714-250-3006

TRAINING

TELETUTOR X.25 Course

The best computer-based
training in the business

TELETUTOR®

TELECOMMUNICATIONS TRAINING SERIES

For **FREE**
catalogue of all our
courses call
800-542-2242
(603) 433-2242

SEMINARS

IN-DEPTH SEMINARS

Basic & Advanced Training
in the IBM Enterprise
Networking Standards for
the 90's

IBM SNA/LU 6.2 APPC

Feb. 2-8 Seattle Area
Hilton

Feb. 26 -
March 1 San Francisco Area
Newark Hilton

For other cities & dates call:
Galaxy Consultants
17235 Buena Vista Avenue
Los Gatos, CA 95030
408 354-2997
FAX: 408 354-2365

DATA COMMUNICATIONS

RJE FOR PC's

Complete Bisync 2780/3780 and SNA 3770 RJE emulation for PC's and PS/2's. Execute batch jobs automatically to or from your IBM host in JES2/3. Featuring...

- IBM Mdl 3777-1 support
- Up to 19.2K bps thruput
- Unattended operations
- Printer, card punch and console support
- Data compression and transparency
- PC-to-PC connectivity

Full warranty • Immediate delivery

From as low as \$249

Call (800) 767-4844 today!

SELL OR TRADE YOUR SURPLUS

modems, mux's,
data pbx, etc.

REPAIRS • UPGRADES • INSTALLATION • CABLING

MICOM codex
paradyne AT&T
IBM Racal-Milgo

ARK CASE Datatel

Universal Data Systems **General DataComm**

NEW AND USED EQUIPMENT BACKED BY WARRANTY.
NATIONWIDE SERVICE, MAINTENANCE AND INSTALLATION.

we need to buy

- TIMEPLEX MULTIPLEXORS
- UDS 208 AB MODEMS
- CODEX 208 AB MODEMS
- MICOM BOX 2 MUX'S
- GDC MEGA SWITCH

call us...

(201) 586-3070 FAX 586-3080

Warwick
DATA SYSTEMS, INC.

66 FORD ROAD, DENVER, NEW JERSEY 07834

CONCORD DATA SYSTEMS

Dial Modem Sale

212 Autodial
224 S I Autodial
V.32 Trellis
296 Trellis

CALL FOR LOW
PRICES

508-681-0600
Ext. 2021 or 2017

The following
advertisers appear
on the
FAXNeT form
on page #39:

Teletutor
UniForum
Warwick
Data Systems

ComNet

June 29, 1989

Ms. Joan Pinsky
Network World
375 Cochituate Road
Box 9171
Framingham, MA 01701-9171

Dear Joan:

I would like to take this opportunity to recognize and to thank *Network World's Networking Marketplace* advertising section for helping ComNet surpass projected sales goals.

ComNet focuses on specialized RF broadband services. By using *Network World's Networking Marketplace* classified advertising, we have penetrated our unique broadband LAN cable design PC software into surprisingly new areas while cultivating the known markets. In addition, *Networking Marketplace* classified continues to draw in more RF Broadband LAN Seminar attendees for us than any other print media.

Again, "Hats Off" to the *Networking Marketplace*, and thank you for your wonderful support.

Sincerely,

John S. Gutierrez
John S. Gutierrez
President

3310 Western Dr. Austin, Texas 78745 512-892-2085 FAX 512-892-0959

NETWORKING CAREERS

ACCOUNT MANAGERS SYSTEM ENGINEERS ESTIMATORS

Transpac is a rapidly growing LAN and high performance media integration and installation company. We are seeking experienced individuals for our California area offices in Los Angeles, Santa Ana and San Francisco.

ACCOUNT MANAGERS shall be responsible for generating sales in major corporations for Local Area Network and high performance cabling media design and installation.

SYSTEM ENGINEERS AND ESTIMATORS shall be responsible for determining the material and labor components of RFP's and the drafting of proposal responses.

Systems, supporting hardware and design services include:

- IBM cabling system
- Broadband
- AT&T PDS
- Fiber Optics
- Ethernet
- Video

Background in LAN's, cabling, media components and their connectivity is required.



Provide resume and salary history:

**TRANSPAC FIBER OPTICS
& TELECOMMUNICATIONS, INC.**
Attention: Peggy Landon
5430 Van Nuys Blvd., Suite 400
Sherman Oaks, California 91401
(818) 906-3066
FAX (818) 906-1793

Equal Opportunity Employer

**We put you
in touch with
over 70,000
networking
professionals
every week.**

That's right!
When your
recruitment ad
appears in
**NETWORKING
CAREERS**,
you reach
Network World's
audience of over
70,000 networking
professionals.

And you can reach
them every week.

For more
information,
call Barbara Hill
at 800-622-1108
(in MA
508-875-6400).

Network World First Quarter 1990 Editorial Features

Jan 8 - Trends and Technologies Reshaping Networks:
Enterprise Internetworking

Jan 15 - Telecom Services Buyer's Guide:
Cellular Services

- Bonus Distribution: ICA Winter Conference

Jan 22 - Bridging 4M & 16M Token LANs

Jan 29 - Datacom Buyer's Guide:
Videoconferencing Systems

Feb 5 - Network World Salary Survey
- Bonus Distribution: Communication Networks

Feb 12 - Ethernet Adapter Interoperability
- Bonus Distribution: NetWorld Boston

Feb 19 - Telecom Services Buyer's Guide: 900 Series

Feb 26 - Trends and Technologies Reshaping Networks:
Higher Bandwidth Needs

Mar 5 - Telecom Buyer's Guide: T-1 and T-3 Multiplexers

Mar 12 - Datacomm Buyer's Guide:
Network Design Software - Harvey Study Issue

Mar 19 - Telecom Services Buyer's Guide:
BOC Centrex Offerings

Mar 26 - 4M & 16M Token Ring Performance

Novell to redress 16M problems

continued from page 1

until last October. Russ Hanson, Novell's product specialist for NetWare LAN Drivers, acknowledged that as a result, Novell's drivers for the high-speed LANs cannot handle the larger 16M bit/sec Token-Ring data packets.

"The way we initially wrote the driver, it didn't pass information across the IBM 16/4 adapters fast enough to allow the features to work," Hanson said. "Users did see some increase in speed over the earlier 4M bit/sec Token-Ring Adapters, but not a significant amount."

Last Oct. 1, IBM convened a meeting at its Research Triangle Park, N.C., facility for Novell, 3Com Corp. and Banyan Systems, Inc., an IBM spokesman said. At the meeting, IBM agreed to make future adapter specifications available to net operating system vendors that requested them.

"We realized that [because the technical specifications of the Token-Ring adapters weren't available], the Novell drivers couldn't exploit the potential of the adapters and users weren't seeing any appreciable performance increase," the IBM spokesman said.

Mouklaf said the low speed effectively prohibited Hoechst Celanese from using any of the performance features of the IBM 16/4M bit/sec adapters.

The current Novell Advanced 16/4 Token-Ring Drivers can only support the 16K bytes of addressable buffer memory available on the older 4M bit/sec adapters and not the larger 64K bytes of buffer memory offered on the 16/4M bit/sec adapters, Mouklaf said.

The current Novell Advanced 16/4 Token-Ring Driver also doesn't allow users to access the early token release, multiple token release or maximum packet size features incorporated in IBM's 16/4 Token-Ring Adapter, Mouklaf said.

"The lack of any of these features bogs down performance and prohibits us from running sophisticated graphics applications that require the higher bandwidth of 16M bit/sec Token-Ring," Mouklaf said.

Novell's Hanson said the firm, assisted by IBM, is working to upgrade its Advanced 16/4 Token-Ring Driver. "In order to handle the larger 16M bit/sec IBM Token-Ring data packets, we have to write additional source code into the drivers," he said. "While there's no specific release date, we're working closely with IBM; the enhanced drivers should be available in the second quarter."

The IBM spokesman said, "From now on, we'll share technical specifications on the adapters as well as specifics on our future product directions so that our adapters will always work with the network operating system software on the market, without making users wait." □

Northern Tel sells part of PBX base to Bell Atlantic

By Bob Wallace
Senior Editor

NASHVILLE — Northern Telecom, Inc. last week said it will sell its direct sales operations and installed PBX customer base in six mid-Atlantic states to Bell Atlantic Systems, Inc. — Bell Atlantic Corp.'s equipment sales company.

The agreement, to be finalized in 10 to 12 weeks, will bring Northern Telecom one step closer to completing its migration from direct sales to use of distributors to sell and support private branch exchanges.

The switch maker has already sold off its installed PBX base in five of seven other regions. Once

the Bell Atlantic sale is completed, Northern Telecom will only sell directly to users in Nynex Corp.'s six-state region and to select national accounts.

Bell Atlantic will acquire an 1,800-customer base representing 450,000 Meridian SL-1 and SL-100 PBX lines and related assets. About 560 Northern Telecom sales, service and support staff will become employees of Bell Atlantic. Terms of the agreement were not disclosed.

As part of the deal, Princeton, N.J.-based Bell Atlantic

agreed to become a national distributor for Northern Telecom PBXs.

Northern Telecom PBX customers said they are hoping the switch maker will transfer support staff to Bell Atlantic.

"We've forged a strong relationship with our Northern Telecom sales, support and technical staff," said Michael Flynn, telecommunications manager for Wolf, Block, Schorr & Solis-Cohen, a law firm in Philadelphia. "I wouldn't want to start over again with a new set of people." □

Court weighs issues of ID

continued from page 1

The Pennsylvania PUC had ruled that Bell of Pennsylvania could proceed with the service without offering call blocking as an option. The only restriction imposed by the PUC was that law enforcement agencies, witnesses and staff of nonprofit violence intervention agencies could have their numbers blocked. Bell of Pennsylvania opposed the option of allowing customers to block their numbers.

A spokesman for the carrier contends that blocking would encourage nuisance callers. He said that in New Jersey, the first place Bell of Pennsylvania's parent company offered caller ID, complaints about annoying or threatening calls have dropped by 50%.

"Technologically, it is not a complicated measure to provide blocking," the spokesman said. But "if you make it available to everybody, it diminishes the value of the service for the people

who buy it."

In the order barring caller ID, President Judge James Crumlish of the Commonwealth Court of Pennsylvania, said he believed there could be irreparable harm to consumers if the carrier is allowed to proceed with the service. He said the ability to capture and store incoming numbers may be a violation of the state's stringent wiretap law.

Crumlish also found fault with the Pennsylvania PUC's decision to prevent disclosure of some groups of users without providing any guidelines on what criteria would qualify a person to have the blocking capability. This failure, he said, could leave vulnerable the very individuals the state sought to protect.

Bell of Pennsylvania will be barred from offering the caller ID service to anyone other than law enforcement agencies and violence intervention groups until the appeals court rules on the issue. Oral arguments are scheduled to be heard in February.

Gary Marx, professor of soci-

ology at the Massachusetts Institute of Technology and an expert witness who testified before the Pennsylvania PUC, said the issue in caller ID services is one of fairness. "Nobody wants to ban the technology, but on the other hand, no one wants to completely unleash the technology," he said.

New technologies have given users an unprecedented ability to track, compile and distribute information on callers, which is bound to lead to numerous legal challenges, Marx said. "This is a case of the elephant's nose under the tent," he said.

So far, the caller ID issue has been dealt with at the state level. But Marx said questions raised by caller ID focus on such fundamental rights of privacy that he expects it to be decided eventually either in the U.S. Supreme Court or by Congress.

Dan Clearfield, assistant consumer advocate in Pennsylvania, said that this case goes beyond privacy. It raises questions about who owns information such as telephone numbers and how far

companies or government agencies should be allowed to go in compiling and selling personal information on callers.

"It's clearly a question of balancing the interest of the people who want the service with the privacy concerns of people who are going to be affected when they make calls," Clearfield said.

He explained that in Pennsylvania, a police officer investigating a crime must get a warrant to obtain an unlisted phone number. "Yet the telephone company has decided that it has the ability to give out your telephone number any time you make a call."

Clearfield also expressed concerns that Bell of Pennsylvania plans to begin marketing caller ID to businesses as a means of compiling lists of consumers and selling that information to telemarketing firms in much the same way corporations compile lists of 800 callers. "From our standpoint, this is the first of what may be many battles about who has the ability to control that information," Clearfield said. □

Users, vendors laud net councils

continued from page 9

that may be years down the road.

James Castle, president of Infotron Systems Corp., a Cherry Hill, N.J., based multiplexer manufacturer, said members of the Infotron Advisory Council are usually senior people in their organization, responsible for current operations as well as long-term planning. By contrast, many participants in the users group are the operations people concerned with applications they can use today.

"The purpose [of advisory council meetings] is to get senior management's views on where the marketplace is headed two to five years out. We get important input on market evolution; product development is then a response to market evolution," Castle said.

While vendors hope the intimacy of the smaller groups and the feedback they get from participants will enable them to keep a close watch on the pulse of the market, users also can gain from the relationship, participants said.

Mark Pytlik, communications

specialist at Statistics Canada, based in Ottawa, agreed that smaller advisory councils are better avenues than larger users groups for users to effect change. Pytlik is president of the newly formed, 20-member 3Com User Group Council.

Although Pytlik is also president of 3Com's Canadian User Group, the company's largest users group, he said, "An individual users group doesn't get to speak to the right people at 3Com. However, at an advisory council meeting, you're meeting the right people — the product managers who can recognize what you're saying and take action on it."

Currid added that being able to influence vendors through advisory councils "saves my company money, time and effort. The biggest benefit for me is we have been able to get [desired] features into products long before the developer would have put them in."

Coca-Cola Foods participates in five councils, but Currid would not identify the vendors because of nondisclosure agreements.

A council of one

While most user advisory panels comprise members representing a range of businesses, Bull HN

Information Systems in Billerica, Mass., sponsors one council made up of only its largest customer, General Electric Co.

The GE Joint Planning Council was formed almost a decade ago, said Robert Donaldson, Bull's vice-president and general manager of major account operations.

Because GE has about 20 different business divisions including industrial, high-tech and consumer products businesses, Bull said it thought GE was a corporation representative of many types of users, Donaldson said.

GE spends more than \$50 million annually on Bull equipment, according to James Taylor, GE's Bull liaison program manager. The reason for participating on the council, Taylor said, is to ensure that Bull's plans for products and services match GE's requirements for products and services.

"That's really what it's all about. We want to make sure we're all on the same page singing the same hymn," he said.

Taylor also said that by participating on the Bull board, his company has often had the opportunity to be the first to beta-test products it has helped define. "This very definitely gives us a

competitive edge," he said.

While some advisory council participants said being the first to obtain a new release of software or first shipment of hardware could give them a head start over competitors, Coca-Cola's Currid cautions that such a privilege is not always an advantage.

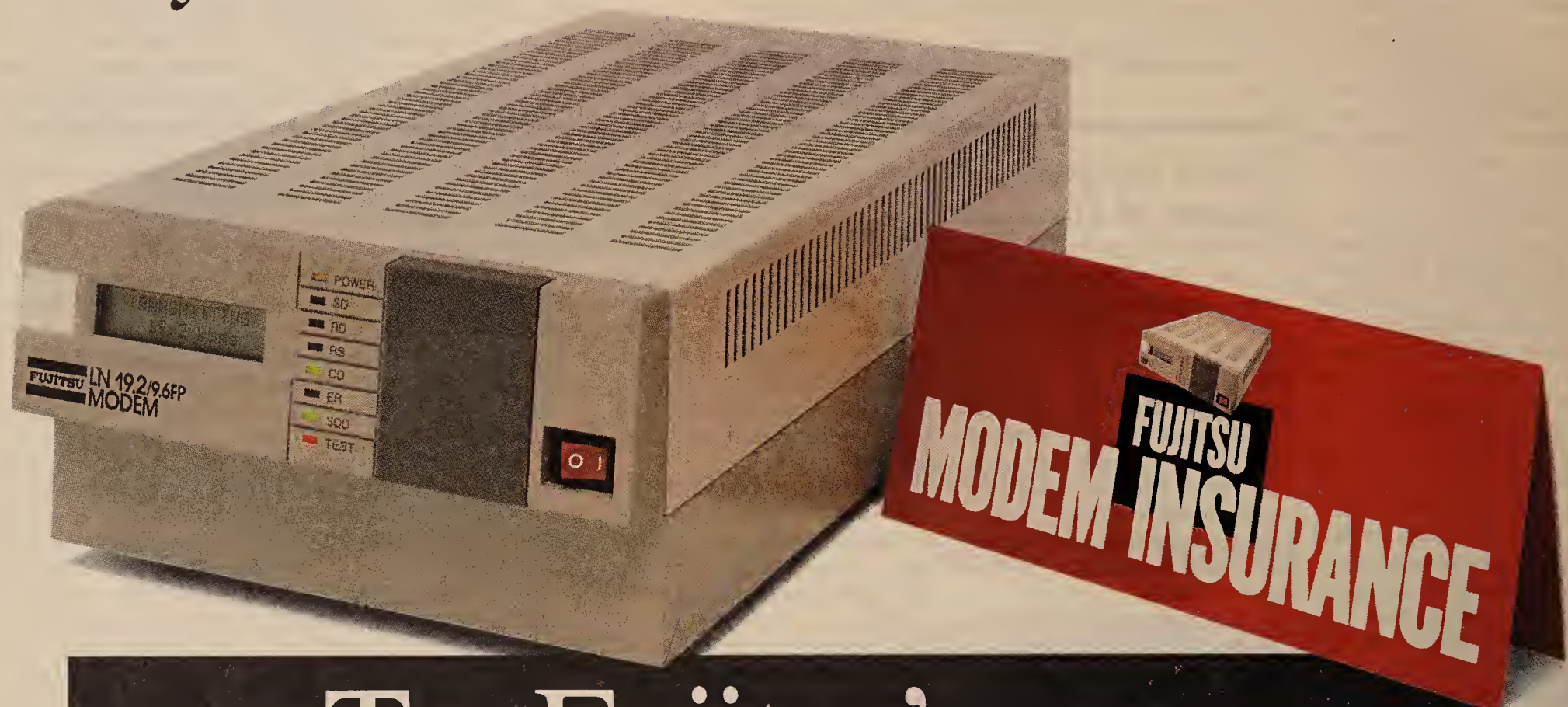
"The earlier in the development cycle you get the product, the buggier it is likely to be," she said. The risk is a user could waste precious time making fixes or helping the vendor debug code.

Tightening the loop

3Com, which already sponsors more than 60 users groups representing 5,000 users worldwide, formed its first user advisory panel two months ago to give the LAN company closer communications with a more manageable number of people.

"Everybody in our industry recognizes how quickly things are changing and evolving. We need to listen to our constituencies" to stay current, said Joan Tabb, 3Com's manager of users group programs. Tabb said she expects the panel will help 3Com tighten the feedback loop in its product development cycle, giving the company a competitive edge. □

*Do you have a multipoint circuit?
Do you want to reduce response time?
Do you need to transmit more data?*



Try Fujitsu's new LN 19.2/9.6FP modem. 30 DAYS FREE!

We're so convinced our new LN 19.2/9.6FP Fast Poll, multipoint modem is the modem you need, that for a limited time we're offering you a 30-day free trial*, including installation. This new split-speed modem permits you to transmit and receive data more efficiently, reducing response time and allowing more users on line.

Our multipoint modem offers definite advantages for inquiry applications where little data is required inbound, but substantially more data is transmitted outbound.

Best of all, the LN 19.2/9.6FP is backed by Fujitsu Modem Insurance — the most outrageous guarantee in the industry. Should your modem fail during the first year, we'll give you another one free. And fix the first one, also for free**.

Take advantage of our free trial offer and discover Fujitsu's efficient solution to your multipoint data communications needs. For more information call Fujitsu America, Data Communications Division at 800-422-4878, in California, 408-434-0460.

*Limited offer is subject to the terms of our 30-day free trial policy.

**The limited offer for Fujitsu Modem Insurance is only open to new purchases of LN, L and EZ modems from an authorized Fujitsu America distributor and is subject to the terms of our Modem Insurance Policy.

FUJITSU